Does childhood disadvantage lead to poorer health in second generation Irish people living in Britain?

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Abstract

Background: Irish-descended people in Britain experience elevated mortality and morbidity, compared with white British people, persisting across generations. Reasons are unknown.

Objectives: 1. To determine the prevalence of: childhood and adulthood psychological morbidity, poorer self-rated health, alcohol misuse and tobacco use, in second generation Irish people relative to the rest of the sample, in a nationally representative cohort. 2. Assess life-course experiences of adversity in second generation Irish people relative to the rest of the sample. 3. Assess how far life-course adversity mediates the association between second generation Irish ethnicity and health outcomes.

Methods: Data from the National Child Development Survey (NCDS) and The 1970 British Birth Cohort (BCS70), in which 17,000 babies born in 1958 and 1970, respectively, followed up until adulthood, was used. 6% were of second generation Irish descent.

Results: Second generation Irish people grew up in marked material disadvantage. By mid-life, Irish people had reached parity with the rest of the cohort on most adversity indicators. Irish children were more likely than the rest of the cohort to experience psychological morbidity at 7, 11 and 16 (NCDS) or 16 (BCS70). This diminished after adjustment for parental health and material hardship. By mid-life, second generation Irish cohort members were more likely to screen positive for common mental disorders (OR: 1.27 (95% CI: 0.96-1.69)), poorer self-rated health (OR: 1.25 (95% CI: 0.98-1.60), binge alcohol use (OR: 1.26 (95% CI: 1.00-1.58)) and tobacco use (OR: 1.29 (95% CI: 1.05-1.58). Associations between Irish ethnicity and all health outcomes were either fully or partially attenuated after adjustment for childhood adversity.

Conclusions: Second generation Irish people in Britain experience adverse mental and physical health over their life-course. This may be due to growing up in circumstances of marked childhood adversity.

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Abbreviations

Adj: Adjusted/ adjustment

AUDIT: Alcohol Use Disorders Inventory Tool

BCS70: British Cohort Survey, 1970 (1970 British Birth Cohort)

BSAG: Bristol Social Adjustment Guide

CAGE: (Assessment tool for alcohol use): Have you wanted to Cut down your alcohol use? Do you feel Angry when others comment on your alcohol use? Do you feel Guilty about your alcohol use? Do you need an Eye-opener first thing in the morning?

CIS-R: Clinical Interview Schedules-Revised

CMD: Common Mental Disorders

COB: Country of Birth

Co: Cohort study

CON: Convenience sample

CS: Cross-sectional

CVD: Cardiovascular Disease

DSM-IV: Diagnostic and Statistical Manual of Mental Disorders-IV

EMPIRIC: Ethnic Minorities Psychiatric Illness Rates in the Community survey

GAD: Generalised Anxiety Disorder

GHS: General Household Surveys

GHQ: General Health Questionnaire

HSE: Health Surveys for England

ICD-10: International Classification of Diseases-10

ICE: Imputations by chained equations

IHD: Ischaemic Heart Disease

MAR: Missing At Random

MCAR: Missing Completely At Random

MI: Multiple Imputation

N; No.*:* Number

NCDS: National Child Development Study (1958 British Birth Cohort)

NI: Northern Ireland

NMAR: Not Missing At Random

ONS: Office for National Statistics

OR: Odds Ratio

PCA: Principal Components Analysis

REF/ ref: Reference

RI: Republic of Ireland

RR: Relative Risk

RS: Random sample

SCAN: Schedules for Clinical Assessment in Neuropsychiatry

SEM: Structural Equation Models

SEP: Socioeconomic position

SRH: Self-rated health

SMR: Standardised Mortality Ratio

UK: United Kingdom

UK NPMS: United Kingdom National Psychiatric Morbidity Surveys

WHO: World Health Organisation

95% CI: 95% Confidence Intervals

1 Introduction

There has been longstanding interest in the associations between migration and health[1]. To a certain extent, such research has been conducted with the premise that aetiological mechanisms of disease might be uncovered[2]. For example, work by Marmot and colleagues highlighted high levels of heterogeneity in mortality in first generation migrants to Britain, which led the authors to postulate that a number of factors relating both to country of origin as well as the post-settlement context, accounted for differing mortality rates[3]. In now seminal work by Odegaard, rates of mental illnesses were examined in Norwegian migrants to the USA, as well as on return to Norway[4]. In both instances rates of psychiatric morbidity were elevated relative to the non-migrant population in the receiving country, leading Odegaard to suggest that people who migrated represented a sub-set of vulnerable individuals with poor interpersonal relationships[4].

Studies of migration and health also frequently highlight widespread health inequalities, considered to be alterable rather than inevitable[1]. Although there has been a recent increase in studies examining the health of ethnic minority groups in Britain, partly from the perspective of needs analysis and service provision[5, 6], until recently the health needs of Irish people living in Britain have been largely ignored[1, 7, 8].

Irish people constitute one of the largest ethnic minority groups living in Britain; An analysis of data from the Longitudinal Study, suggested that approximately six million people, or 11% of the total population of Britain were of either first, second or third generation Irish descent[7], and this figure is likely to be an underestimate[7]. Migration to Britain from the 'new commonwealth' began in the late 1950s, however the longstanding relationship and geographical proximity of Ireland to Britain has meant that significant migration from Ireland pre-dated this demographic shift. In 2001 an 'Irish' ethnicity category was incorporated into UK Census codes[8]. Prior to this, Irish people living in Britain were obliged to endorse the 'White other' category to describe their ethnicity, despite almost four decades of research (using country of birth and parents' country of birth) consistently suggesting that Irish people experienced adverse

mental and physical health (including mortality) outcomes, in spite of improvements in socioeconomic position across generations [9, 10]. Even though previous research examining these health inequalities had suggested that the observed health differences were not fully accounted for through socioeconomic position [9-11], it was felt by some that to direct time and attention to the health of Irish people was wasteful [12]. Underlying this notion was a sense that time and resources spent examining health inequalities amongst Irish people in Britain would in some way divert attention from the health needs of other ethnic minority groups, and that resources would be better spent dealing with socioeconomic deprivation within the whole population [12].

Yet, historically, Irish people have experienced similar levels and types of discrimination and stigmatisation as other ethnic minority groups[1][8, 13, 14] and had been subject to similar labour migration forces that had brought people from countries in the Commonwealth[2] to Britain in the post-war years, when labour shortages had hindered reconstruction efforts [15, 16]. A particular concern is the extent to which health inequalities affecting people of Irish descent has not only persisted, but possibly deteriorated across subsequent generations [9, 10, 17]. This observation highlights the shortcomings of Marmot et al's original thesis which suggested that migrant groups and their children would come to experience similar/ equivalent health outcomes to the receiving-country population over time [3]. In addition, several commentators have noted that all-cause mortality[3, 18, 19], as well as mortality from ischaemic heart disease, cerebro-vascular disease and neoplasms (particularly of the lung) [19], attempted suicide [20, 21], and completed suicide [18, 22] of Irish people living in Britain is elevated compared to Irish people living in Ireland, which would also support the notion that there is something about 'being Irish in Britain' [13], and exposures

[1] *"Older Irish people who arrived in the UK before such overt discrimination was made illegal may remember 'no blacks or Irish' notices on the doors of boarding houses, and may have feared hostility toward them when the IRA was most active*" (Fitzpatrick & Newton, 2005)

[2] Although Ireland left the Commonwealth in 1949, policy facilitating the movement of Irish people from Ireland to Britain remained fairly lax; see my discussion of this later.

related to the environment, which may be more important in accounting for health inequalities.

Therefore, understanding health inequalities impacting on Irish-born and Irish descended people should be an important public health priority. Given the close relationship which Ireland has always had with Britain, both with respect to historical relations and in terms of geographical proximity, some commentators have likened Irish migration and settlement to Britain as akin to migration within the Scandinavian regions [23], where there have also been historically fewer restrictions to migration and settlement, but where migrants within these regions also experience well-documented inequalities in health, relative to the rest to the population of the receiving country [24-29].

A coherent theory which encapsulates the specific life-course factors that may explain health inequalities in second generation Irish (and other) ethnic minority groups remains conspicuously absent from theoretical accounts of life-course epidemiology[1, 30]. In particular an account of how social and health inequalities may be 'transmitted' to second generation ethnic minority groups remains under-theorised and may be relevant in understanding why and how health inequalities have persisted in Irish-descended people, over multiple generations[10, 17, 31].

In this thesis, it is envisaged that through an analysis of two birth cohorts- the 1958 British birth cohort and the 1970 British Birth cohort, it will be possible to bring together themes relating to migration and the 'transmission' of health inequalities from first generation migrants to the second generation. I will use these two cohorts to explore linkages between the settlement experiences and health of Irish-born/ first generation Irish parents and the transfer of social, material and health inequalities to their children (second generation Irish cohort members). Crucially, I will be able to examine how prospectively assessed experiences of adversity in childhood and over the life-course interact with health outcomes in second generation Irish people living in Britain.

The periods spanned by the birth cohorts were unique in terms of encapsulating a time period when migration to Britain from Ireland and the Commonwealth became increasingly significant[32], as Britain entered a phase of rapid economic expansion, followed by a period of recession in the late 1970s and 1980s. In the second chapter I will highlight the historical and social context of Irish migration to Britain. I will also discuss previous research which has elaborated on health disadvantages observed in first, second and later generation Irish people living in Britain. The experience of Irish migration and settlement in Britain- and the ensuing health inequalities which have often been described, may bear some similarities to that of other second generation ethnic minority groups, and I will also consider this issue further in the second chapter.

In Chapter 3 I will consider a rapidly growing body of work which has come to be described as the field of 'life-course epidemiology'[33]. Specifically, I will explore life-course epidemiological theory relevant to the main outcomes (of common mental disorders, self-rated health and health-related behaviours), to be analysed in this thesis. For example, the role of a 'sensitive period' in childhood in accounting for a variety of adverse down-stream health outcomes (and the aetiological mechanisms through which this may occur)[33-35] will be considered in this chapter.

In Chapter 4, the role of migration-related social mobility and how this may be associated with common mental disorders will be examined, using a systematic review and meta-analysis[36]. Although common mental disorders was the only outcome considered in this review, the processes of migration and changes to the migrant's socioeconomic position and social standing will be considered in greater depth in this chapter. A clearer understanding of migration-related social mobility will help to clarify links between social and material inequalities and health, as explored in this thesis. I had planned to review the literature on intergenerational social mobility in second generation ethnic minority groups and associations with common mental disorders in this chapter, however the resulting literature retrieved was disappointingly sparse. Despite this, I consider implications with respect to social mobility and mental health in second generation ethnic minority groups in this chapter.

In Chapter 5 I provide an overview of the main themes from the literature reviews and briefly consider the main aims and study objectives of this thesis. This will lead on to Chapter 6, which provides a detailed description of the main methods, including statistical methods, used to analyse the two birth cohorts.

Chapters 7-9 present the main results of the thesis; In Chapter 7 I describe the findings relating to psychological morbidity in the childhood sweeps (up to age 16) in the 1958 British birth cohort and in the 1970 British birth cohort. In particular the prevalence of childhood psychological morbidity in second generation Irish cohort members (relative to the rest of the sample) alongside potential 'mediating' mechanisms for childhood psychological morbidity, are considered in this chapter. In Chapter 8 I present findings relating to childhood and adulthood (up to mid-life/ age 45) in the 1958 British birth cohort, and specifically I present findings relating to social and material adversity as well as common mental disorder and self-rated health in second generation Irish cohort members, relative to the rest of the sample. In the final results chapter (Chapter 9) I present findings relating to social and material adversity stratified by gender in the 1958 birth cohort, and examine mechanisms relating to the life-course in patterning health-related behaviours such as alcohol misuse and tobacco use in second generation Irish cohort members, relative to the rest of the sample. The final chapter- Chapter 10, summarises the main findings across each of the three studies and in particular discusses common themes, study limitations, and implications for future policy and research.

2 Irish migration to Britain and a review of the health inequalities literature

Introduction

In this Chapter I aim to provide an overview of the historical and political context of Irish migration to Britain, and will suggest the ways in which these may be relevant to understanding the reported health inequalities affecting Irish-born people to Britain. In the second part of this Chapter, an overview of the health inequalities literature relevant to both Irish-born and second and later generations of Irish people will be presented, and the reasons for these persistent inequalities, as proposed by previous commentators, will be discussed. Towards the end of the Chapter analogies will be drawn with research relating to other migrant and second generation groups, particularly within the Scandinavian regions, as it is envisaged that some of the broader factors highlighted in this study may have particular relevance to migration in some other settings.

Historical backdrop

Irish migration to Britain has a long and, at times, politically charged history[37]. An Act of Union in 1801 brought Ireland and Northern Ireland together with England, Scotland and Wales, forming the 'United Kingdom of Great Britain and Ireland'. In 1922 partition resulted in a division of the Irish Free State[3] from Northern Ireland, the latter joining England, Scotland and Wales, to form the United Kingdom and Northern Ireland. The context suggests a longstanding relationship between Ireland and Britain with historical ties that go beyond a simple geographical proximity issue, and to a certain extent qualitatively defines a relationship which differs from that of Wales or Scotland with England [38]. In terms of migration policy, the relationship between Ireland and Britain has, for example been represented through the Common Travel

[3] The Irish Free State was granted Dominion status in 1922. It would later become the Republic of Ireland in 1948, leaving the Commonwealth.

Area, encompassing passport-free travel within the regions of Ireland, Britain, the Channel Islands, and the Isle of Man[4], which has meant that travel between Britain and Ireland has always been relatively unrestricted[5], and tended to facilitate the ease of movement of Irish nationals to Britain[39]. At times the British government has been open in its desire to promote the free movement of Irish nationals to Britain to deal with labour shortages, as well as to "*maintain good relations with the Irish Government in the context of the emergent conflicts in Northern Ireland*" [39]. A further peculiarity is reflected in British law, whereby Irish citizens living in Britain are recognised as British subjects with a right to the vote, even though Ireland left the Commonwealth in 1948[6] (cited in [40]).

In general, the pattern of migration from Ireland has predominantly been one of out-migration[16]. In particular, migration from Ireland to Britain peaked during the famine years (1840-1850)[16, 37], and then later, continued as a result of unemployment and economic recession in Ireland [16]. The Ireland Act of 1949 allowed Irish citizens to settle in Britain with relatively little restriction[16]; unrestricted movement of labour from Ireland to Britain was extremely beneficial to the post-war reconstruction of the

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[4] See http://historical-debates.oireachtas.ie/D/0012/D.0012.192506040012.html Dáil Éireann - Volume 12 - 04 June, 1925 COMMITTEE ON FINANCE. - VOTE 29.—OFFICE OF THE MINISTER FOR JUSTICE, which detail discussions at parliamentary level within Ireland acknowledging reciprocal travel arrangements for visa-free travel between the two countries. Hansards from Britain

see http://hansard.millbanksystems.com/commons/1992/oct/29/cross-border-security#S6CV0212P0_19921029_HOC_19 (29th October 1992; Commons Sitting; Northern Ireland; 'Cross border security' *HC Deb 29 October 1992 vol 212 cc1116-7)* suggest an open acknowledgement in parliament, that to restrict free movement between the two countries would impact negatively on trade and on a deleterious manner on "*the large number of Irish citizens who live in this country and who come and go between here and the republic".*

[5] Although formal legislation regarding the *Common Travel Area* came into effect from 1952, Ryan (2001) suggests that from the establishment of the Irish Free State (with Dominion status) in 1922, administrative policies had already started to ensure relatively informal movement of people between Ireland and Britain.

[6] See:
http://www.direct.gov.uk/en/Governmentcitizensandrights/UKgovernment/Politicalpartiesandelections/DG_073240

British economy and may have also favoured the Irish economy through remittances sent back to families remaining behind.

Patterns of migration and settlement of Irish-born migrants

Much of the following relates to migration to Britain in the twentieth century, as this is the backdrop for the present analysis. However it is important to stress that migration from Ireland to Britain spans several centuries. Catholics living in Scotland are mostly Irish descended, and formed just under a third of the population in Glasgow in 1991 (cited in [17]). Many Irish-descended people living in Scotland were part of initial migratory waves in the 1840s, where people became employed in manual sector industries such as manufacturing (cited in [41]). In addition, other regions in Britain, in particular the North West (Lancashire and Merseyside) saw significant settlement of Irish communities prior to the twentieth century[42]. The following figure illustrates this**.**

Figure 2-1[7]: Irish settlement in Britain in 1851

[7]Original source: '*Illusional Ministry'* (author) Taken from Wikipedia, accessed June 2013 https://en.wikipedia.org/wiki/File:Irish_emigration_to_Great_Britain.svg#filehistory

During the post-war reconstruction years, Irish settlement centred around the Midlands, with later waves of Irish-born migrants settling in the south east of England[16]. It has been suggested that the current ageing population of Irish-born people living in England represent a 'first-wave' of Irish-born men and women who came for work, with destination occupations largely concentrated in the construction and domestic service industries, in the post-war reconstruction years of the 1950s [16]. Evidence from qualitative work has suggested that the harsh economic realities in Ireland had led to a relatively normalised view of migration amongst Irish people; in some cases migration came to be perceived as an 'inevitable' response to economic recession in Ireland, at times tinged with fatalism, or as the only viable means of escaping rural isolation [43, 44]. The ease with which Irish people could migrate to Britain meant that the process itself was perceived as 'an adventure' or temporary [45].

Migration from Ireland at this time has also been suggested to have been highly gendered, with younger women migrating for work in the more stable profession of nursing, with pre-arranged jobs and tied accommodation, and being able to afford to send money home to their families as well as afford small luxuries [16]. The provision of free training places on nursing schemes in Britain further promoted this migratory wave, and many trainee Irish-born nurses stayed on in Britain for work after qualifying (cited in [23]). Other women would find work within the domestic sector[43]. Although both male and female Irish-born migrants to Britain would benefit from the economic independence from family ties at home, migration to Britain also offered many women the possibility of escape from an otherwise difficult existence where the only other option (aside from migration) might have been marriage[43, 46].

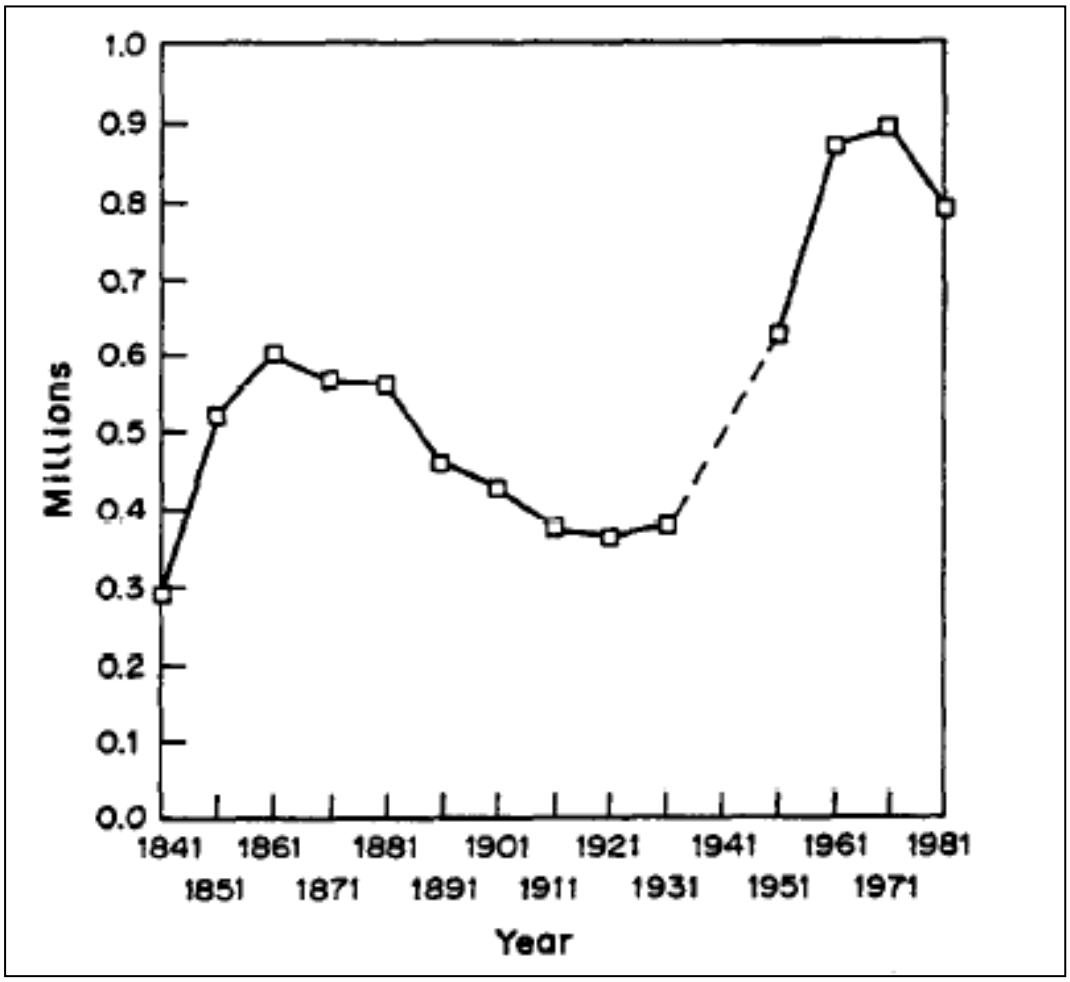
The reality for Irish-born men migrating to Britain in the 1950s was more difficult [16]. Many of the men arrived for work in the construction industry, where work was frequently transient, leading to frequent relocations around Britain at relatively short notice. In contrast to some Irish women who tended to recall their early days in Britain as 'exciting' [16], for the men the reality was one of "*extremely hard labour, loneliness, and being homesick….with their only solace being meeting other Irish people at a dance, in the pub, or at mass on Sunday*" [16]. The highly gendered nature of migration

from Ireland to Britain is reflected in Census estimates from 1971, which described 31,000 Irish-born nurses working in England[13]. By 1991, 32% of Irish-born men reported that they worked in the construction industry[13].

A later ‘wave’ of Irish-born migrants came to Britain from the 1980s onwards, and it has been suggested that this ‘second wave’ represented a cohort of people who were relatively well educated, and who took up posts in professional and managerial positions[16]. Many Irish-born migrants to Britain settled in England- particularly in London and the south east of England, during the 1980s and 1990s[7]. It has been noted, in parallel with these migration trends, that there has been a discernible reduction in the population of second generation Irish people living in Scotland over more recent years- as the population of the second generation has shifted further south[7].

The following figure (from [18]) shows the numbers of Irish-born people resident in England and Wales from 1821. As the authors of the figure suggest, there have been two ‘peaks’ in Irish migration- the first around the 1860s, and the second around 1961[18]. The authors suggest that the peak drops off after the latter time point due to possible reverse migration back to Ireland [18].

Figure 2-2: Numbers of Irish-born people (in millions) settled in England and Wales, from 1821 to 1981



This figure has been taken from Raftery, Jones, Rosato. 1990 [18][8]

[8] Original source: 1986 Census of Population. Stationery Office, Dublin, 1987 (Raftery *et al*, 1990).

Social context of second generation Irish people living in Britain

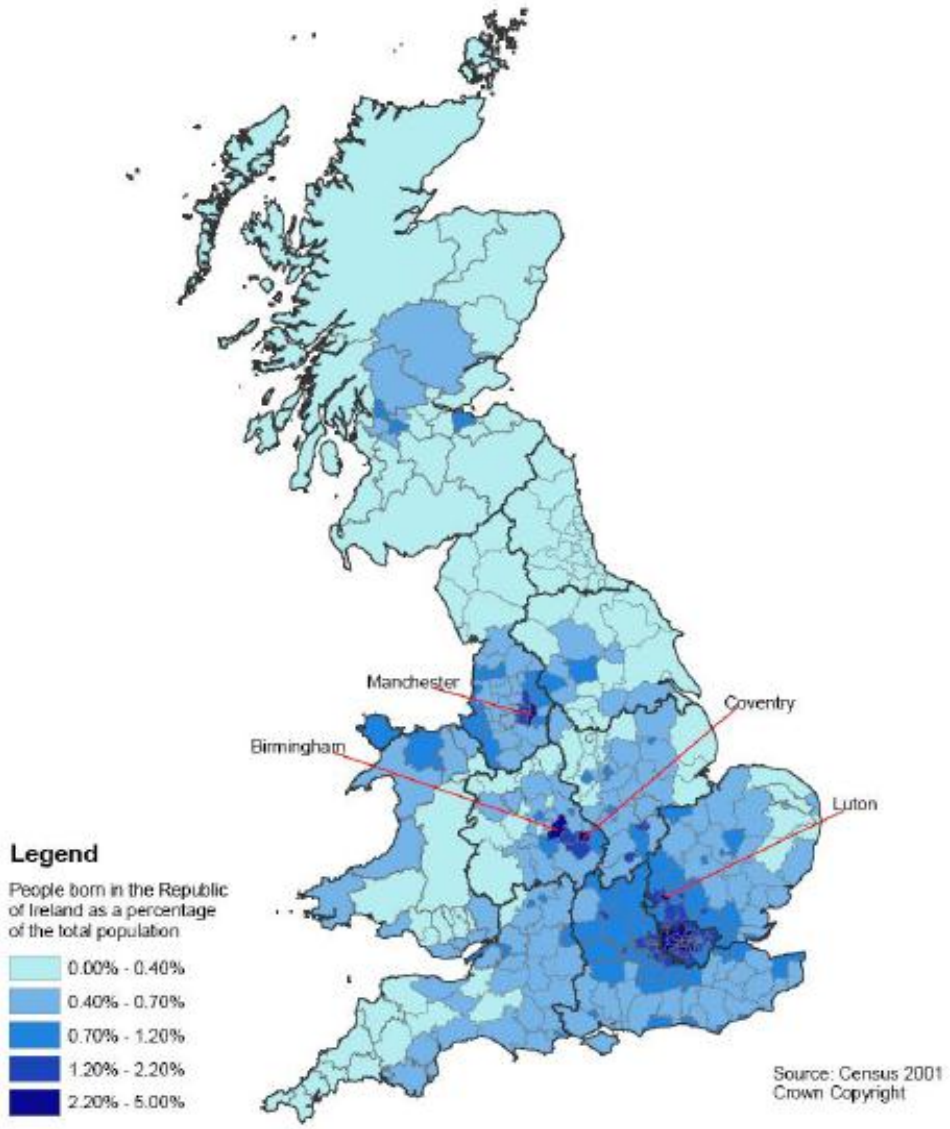
The demographic correlates of second generation Irish people living in Britain are broadly consistent with the migratory trends described for Irish-born people in the previous section. That is, if the first (major) wave of migrants from Ireland arrived in Britain in the 1950s, and had children either soon after or before this time, their children would be reaching their 40s/ 50s by the end of the last century. This is confirmed through analysis of Census data from England in 2001 which suggested that the demographic profile of second generation Irish people were younger than the UK-born White British population, and predominantly concentrated in the middle age groups (age 30-44) [47]. The findings have been additionally confirmed in analyses of age structure using data from the Longitudinal Study[9], where over half (54%) were aged under 17 at the time of the survey in 1971 [7].

An analysis of data from the 1970 British Birth Cohort, the General Household Survey, the 1983 Labour Force Survey, and the Longitudinal Study [7], suggested that the geographical birth and settlement patterns of second generation Irish people living in Britain, matched the migration and settlement patterns of first generation Irish people, as described in the previous section [7]. That is, the greatest concentration of second generation Irish people was in Greater London (between 17.2% to 28.1% of the total population), the South East (between 18% to 38.9%) and in the North West (14.8%-17.0%), and the West Midlands (11.0-12.7%)[7]. In general, settlement has tended to be in urban over rural areas[42]. The geographical distribution of second generation Irish people in Britain is fairly similar to that of their parents, although in Scotland whereas the second generation outweigh geographical concentrations of Irish-born (first generation) people, in England, second generation Irish people are more geographically dispersed [7]. Settlement patterns in second generation Irish compared to Irish-born people have also been shown to be fairly similar, when compared to more recent data

[9] The Longitudinal Study was based on a 1% sample of the population of England and Wales (Hickman et al, 2001)

taken from a survey of ethnic minority people living in England, performed in 2000[48]. The following figure suggests that Irish communities are still predominantly located in Manchester, Birmingham, Coventry, West of Scotland and London. There are close similarities to the picture of settlement to almost 150 years previously.

Figure 2-3: Geographical distribution in England, Scotland and Wales of people born in the Republic of Ireland (2001)[10]



[10] Figure from *(49. Moore, J., et al., Fresh Perspectives: A Needs Analysis of the Irish Community in London. 2012, London Irish Centre: London.)*; based on data from the Census, 2001

Socioeconomic position across the life-course and social mobility in second generation Irish people

Analysis of socioeconomic position across the life-course remains central to understanding health inequalities in migrant and second generation groups, for a number of reasons. First, ever since the Black Report [50] strong and consistent associations have been demonstrated between socioeconomic position and most physical and mental health outcomes [51]. Second, changes to socioeconomic position across the life-course ('intra-generational social mobility') and across generations ('intergenerational social mobility') provide some indication of how social inequalities replicate within the same generation, or across generations. This, in itself may suggest the ways in which life-chances, and specifically 'access to resources', may differ in migrant and second generation groups relative to the rest of the population [52]. Some authors go as far as to suggest that if parity in educational and socioeconomic position is achieved in migrant and second generation groups relative to rest of the population, then 'assimilation' might be inferred[52]- although as will be discussed later, this may be a problematic assumption.

The following section considers the literature around life-course socioeconomic position and social mobility in Irish people. As will be discussed in the next chapter, the processes which underpin 'enhanced upward social mobility' in second generation Irish people may also be relevant to other ethnic minority groups[53, 54], and it will be important to consider these processes over the life-course, specifically with the context of migration in mind.

Many investigators have considered the distribution of social class and other measures of socioeconomic position (including tenure) in second generation Irish people and first generation Irish people. Although these analyses provide an overview of the distribution of affluence and disadvantage in these and other ethnic minority groups, arguably it is not possible to directly comment on either intra-generational or intergenerational social mobility as these analyses have not considered changes to socioeconomic position within the same individuals, or directly from parent to child (across generations). The findings from these investigations have tended to suggest that in general second

generation Irish people are in more affluent positions by adulthood compared to Irish-born people[10, 55, 56], or in more favourable socioeconomic positions compared to white British people [55], or compared to the rest of the study sample [9, 10][11]. A similar pattern has been described for some other ethnic minority groups living in England [55]. In another analysis of Irish health[12], the demographic profile of second generation Irish people also appeared more favourable relative to Irish-born people, in terms of social class and education, however parity on other socioeconomic indicators (such as tenure and housing indicators such as overcrowding, bath/ shower/ WC or heating) was still not equivalent to people who identified themselves as 'White British', in this analysis [47].

Consistent with the observation of generally enhanced upward social mobility, an analysis using data from a variety of sources, including the 1970 British Birth Cohort, the Longitudinal Surveys, and the General Household Surveys (GHS), found that the occupational social class of second generation Irish men appeared to converge with the rest of the population, whereas that for second generation women, was higher[7]. With respect to education, two separate analyses have been consistent in suggesting that second generation Irish people attained educational qualifications either equivalent to, or better than, white British counterparts [7, 52], leading one investigator to consider the role of Catholic schools in enhancing educational attainment and social mobility in Irish children[7].

In an analysis of ethnic minority intra-generational social mobility and intergenerational social mobility, Irish-born migrants, alongside other first generation migrant groups (including Black Caribbean, Indian and Pakistani men) showed high levels of upward

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[11] Although this may not be the case for all markers of socioeconomic position. An analysis of the longitudinal study found second generation Irish people to be in a higher social class position than all other longitudinal study members, but less likely to own a car (Harding & Balarajan, 1996).

[12] This analysis only examined second generation Irish people who were born in the UK and identified themselves as 'Irish'; the author did not examine people of Irish-born parentage, not reporting their ethnicity as 'Irish' (Clucas, 2009). This may have led to a misclassification as many second generation Irish people may have identified themselves as 'British'.

social mobility, which was most pronounced in Irish-born men[54]. The authors suggest that although many migrant groups may have experienced downward social mobility on arrival to Britain, over time many of the people may have regained "some of the ground they had lost as they acquired more know-how about how to find jobs in Britain" [54]. The findings of the analyses performed on a later time period in British history (1980s/ 1990s) suggested that first generation migrants experienced significant upward mobility [54]. In the second generation, Irish men, alongside the other second generation groups studied (which included Black Caribbean, Indian, and Pakistani men) showed enhanced levels of upward social mobility, relative to the White British group [54], although the authors caution that this may be due to a larger proportion of the men in these groups starting off at lower socioeconomic positions [54] . In further analyses adjusting for social class starting points, the authors note that whereas second generation Pakistani and Black Caribbean people were less likely to gain access to the higher tiers of social class, second generation Irish and Indian men appeared to be more likely to move into the upper tiers of social class relative to White British people, which led the authors to suggest that these two groups experience "greater competitive success in the labour market" [54]. This analysis also found that second generation Irish women and Black Caribbean women experienced high levels of upward intergenerational social mobility which was not just a function of lower socioeconomic position starting points [54]. The findings of this analysis are consistent with another analysis of intergenerational social mobility in ethnic minority groups living in Britain [53], although the latter study did not include a second generation Irish group. This finding has been replicated in another study, which found that after standardising for social class origins, second generation Irish people experienced greater upward social mobility than Irish-born men and women, or the English control groups; although this was not the case in men of Northern Irish descent [52].

Therefore, it is likely that measures of socioeconomic position over the life-course have not remained static either within one generation of Irish-descended people or across two or more generations. This may have important associations with later downstream health outcomes, for example, one may expect enhanced upward intergenerational

social mobility to possibly mitigate the effect of earlier adversity with later poorer health[35]. In the next chapter I will specifically consider the role of social mobility across the life-course in accounting for later downstream health, and tie this in with the literature on the associations of social mobility, migration and health.

Irish Health Disadvantage: A Review of the Literature

Examination of Irish health inequalities using data from Britain spans almost four decades. In the following section I will synthesise these findings and critically appraise the reasons suggested for these health disparities. In the narrative literature review that follows, I have concentrated on studies of mortality and self-rated health, suicide and the common mental disorders, childhood emotional and behavioural health, alcohol misuse and tobacco use[13], as these will be the focus for enquiry in this study. In addition, there is some literature specifically examining health inequalities in Irish traveller communities [60]. As this group will not be examined in the present analysis, these studies have not been included.

Mortality

Table 2-1 displays key studies which have examined mortality in Irish people living outside Ireland. Studies examining mortality from suicide and alcohol dependence/ misuse have been considered separately.

The earliest studies of Irish mortality in Britain noted the large excess mortality risks which Irish-born migrants experienced relative to the non-migrant population, as well as compared to Irish people in Ireland [3, 61]. When stratified by social class, these studies also suggested that not only was a social class gradient for mortality in Irish-born people evident, but that for each level of occupational social class, Irish-born people had a mortality in excess of the reference population, which usually comprised non-migrant people living in Britain [3, 18][14]. Initially, some investigators[3, 61, 62] suggested that

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[13] There is also literature relating to cancers 57. Harding, S., *The incidence of cancers among second-generation Irish living in England and Wales.* Br J Cancer, 1998. **78**(7): p. 958-961. and psychosis 58. Cochrane, R. and S.S. Bal, *Mental hospital admission rates of immigrants to England: A comparison of 1971 and 1981.* Social Psychiatry and Psychiatric Epidemiology, 1989. **24**(1): p. 2-11, 59. Commander, M.J., et al., *Psychiatric morbidity in people born in Ireland.* Social Psychiatry and Psychiatric Epidemiology, 1999. **34**(11): p. 565-569. differentially affecting Irish-descended people, however this is beyond the scope of the current investigation. Suicide and mortality have been included in the literature review (even though they will not be directly examined in this study) because of their associations with the common mental disorders and with self-rated health.

[14] Although these studies did not formally assess interactions.

observed health inequalities in Irish-born migrants were due to the "*lack of restriction on immigration*", (making) "*social and health disadvantages a stimulus rather than a barrier to migration*"[3]. This would tend to support the view that Irish migration (contrary to migration from further afield where 'healthy migrant' effects are operating[63]) would be characterised by people with poorer health migrating.

However, if 'selection effects' account for health differences[3, 61, 62] then one would expect that over subsequent generations, health disadvantages in the migrant group would approximate closer to that of the receiving country population[3, 61]. This has not been supported by later work examining second[9, 18], third [10] or later generations of Irish-descended people [17]. In keeping with the view that socioeconomic disadvantage may be important in accounting for the health of Irish-born migrants, but is not a sufficient explanation for poorer health in subsequent generations, later studies have shown that excess mortality differences minimised or disappeared when adjusting for socioeconomic position in Irish-born migrants [10], but continued to persist in second[9], third[10] and later[11] generation Irish-descended people, after adjustments for socioeconomic position.

Table 2-1: Studies examining mortality in first and second (or later) generation Irish-descended people

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
Wild et al 2007, [64]	Census data from 2001 for England and Wales. Cause of death encoded according to ICD-10	First generation	Reference-population of England and Wales as a whole.	Indirect standardisation using population of England and Wales, in 5 year age bands and according to sex.	1. SMRs higher for Irish-born migrants (men: SMR-128 (95% CI: 126, 129); women: SMR-113 (95% CI: 111-115). 2. Deaths by circulatory disease higher in Irish-born migrants; Men SMR: 119 (95% CI: 116-122); women SMR: 109 (95% CI: 107-112). 3. Deaths by IHD higher in Irish-born migrants: Men SMR: 118 (95% CI: 115-122), women SMR 108 (95% CI:105-112) 4. Deaths by cerebrovascular disease also elevated in Irish-born. Men SMR 127(95% CI:122-134), women SMR 111 (95% CI: 107-116)
Wild et	Census data from 2001-2003	First	Reference-	Indirect	1. Deaths by all cancer: Men SMR-125

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
al, 2006 [65]	for England and Wales.	generation	population of England and Wales as a whole.	standardisation using population of England and Wales, in 5 year age bands and according to sex.	(95% CI: 122-129); women SMR-110 (95% CI: 107-113) 2. Deaths for lung cancer: Men SMR-149 (95% CI: 143-157); women SMR-136 (95% CI:128-144) 3. No differences for prostate cancer for men 4. Breast cancer slightly lower in Irish-born women; SMR 93 (95% CI: 86-100) 5. Colorectal cancer elevated in Irish men SMR: 132 (95% CI: 122-142) (no difference in women)
Kelleher et al 2004 [66]	Analysis of Census records from Boston USA; 1850-1970. Narrative historical review which also compared	First and second generation	White Non-Irish Americans, Italian-born	Narrative historical review of Census records. Note problem of	1. Across all years surveyed Irish-born and second generation Irish people in USA had elevated mortality from circulatory disease, pre-1900s high rates

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	infant mortality (at area-level) with later cardiovascular disease mortality. Country of birth and parents' country of birth used.		Americans, African Americans	ecological fallacy- the authors review mortality at area-level with records of Irish-born mortality over 1850-1970, but do not have data on individuals. Authors also review previous studies of Irish Americans.	of tuberculosis-related mortality noted 2. Strong correlations between infant mortality in areas populated by Irish people in the 1930s with stroke and coronary heart disease from 1994-1998, leads the authors to suggest childhood deprivation and the life-course in accounting for CVD mortality in adulthood
Harding, Balarajan, 2001 [10]	Longitudinal study by ONS, linkage study representing 1% of the population of England, Scotland and Wales. Country of birth of parents, grandparents. First generation included people born in Ireland or Northern Ireland. Second/ third generation had	First, second and third generation Irish	Described as 'all other study members'	Cox regression to derive age-adjusted Hazard Ratios for mortality, socioeconomic position assessed using car and tenure in 1971.	1. Age-adjusted hazard ratios were elevated in third generation>second generation>first generation ('all other' were reference group), in both men and women. 2. This excess risk persisted after adjusting for tenure and access to a car in 1971 for second and third generation

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	to exclude people with parents/ grandparents born in Northern Ireland as they were classed as born in UK				Irish people but disappeared for Irish-born people. 3. Third generation were in a more affluent socioeconomic position than second generation than first generation Irish people.
Williams & Ecob, 1999 [42]	Longitudinal Survey data from 1971 linking region of residence with Irish mortality. COB used. Broad categorisation of counties (urban, etc).	First and second generation	Non-Irish	Multi-level models which assessed the contribution of regional effects (settling in higher mortality areas) in accounting for excess Irish mortality versus individual-level	1. In urban areas 1st generation versus non-Irish OR: 1.34 (95% CI: 1.07-1.66); 2nd generation vs. non-Irish OR: 1.65 (95% CI: 1.21-1.94) 2. Proportion of Irish people settled in the county in 1891 (continuous) OR: 1.31 (95% CI:1.14-1.51) 3. Accounting for regions in multi-level

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
				effect of Irish accounting for mortality. Also assessed cross-level interactions (individuals with regions). SMRs calculated.	models did not impact on fixed effects of (individual-level) Irish with mortality. 4. Differential mortality between 1st generation and 2nd generation Irish people is not explained through variation by counties. 5. No interaction with individual-level and regional level factors for mortality
Abbotts, Williams & Davey-Smith, 1998 [17], Abbotts, Williams & Davey-Smith,	Data collected from men and women in workplaces from the West of Scotland (Glasgow, Grangemouth and Clydebank) between 1970 and 1973. This formed the basis of a cohort. Irish surname used to denote patrilineal descent (as authors felt COB would not be	Men of patrilineal descent- 15% were of Irish descent. Authors presume descent from migration dating from	Irish name vs. 'non-Irish' name	Mortality flagged over a 21 year period was primary outcome. Analysed with Cox proportional hazards.	1. All-cause mortality elevated in men of patrilineal Irish descent; HR: 1.22 (95% CI: 1.08, 1.38) 2. Especially elevated for deaths from cardiovascular disease HR: 1.53 (95% CI: 1.27, 1.83), and suggestion of elevation in: injury or poisoning HR: 1.42 (95% CI: 0.78, 2.61), cerebrovascular disease HR: 1.30 (95%

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
1999 [11]	adequate- migrated many generations ago, also self-defined ethnicity inadequate as people prefer to identify themselves as 'Scottish' etc).	$19^{th}/20^{th}$ century.			CI: 0.86, 1.95) 3. Medical, physiological and behavioural risk factors + variables for (recalled) childhood and adult SEP reduced excess risk by a third 4. However excess risk persisted after taking into all factors noted in 3 (HR: 1.35; 95% CI: 1.14-1.58).
Maxwell & Harding, 1998 [67]	COB. All-cause mortality and cause-specific mortality for 1991-1993.	First generation	SMRs standardised to 5 yr mortality for England and Wales	Age and sex-specific mortality for England and Wales used as the standard. Marital status was also adjusted for,	Excess all-cause and cause-specific mortality elevated in men and women from Republic of Ireland, but this reduced greatly after adjusting for marital status. Rate ratio for all-cause mortality in Irish women was 1.28 (1.14-1.45) and in Irish men was 2.06 (1.89-2.25) [not married to married].
Harrison et al,	Data on cause of death according to ICD-10	First	Descriptive-south Asian	SMRs calculated standardised to age	1. SMRs in Irish-born people greatly elevated relative to Caribbean and

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
1997 [68]	diagnoses for all alcohol and substance misuse categories obtained from OPCS for 1979-1991. This included deaths from chronic liver disease and cirrhosis. COB for ethnicity.	generation	& Caribbean groups	and sex structure of the population. Proportional Hazards model assumed.	South Asian-born people, peaks at >300 in 1988 2. Over time SMRs appear to be increasing in Irish-born, especially over 1985-1988 with a suggestion of a small decline from 1988 to 1990, although even in 1990 SMR was 250
Harding, Balarajan, 1996 [9]	Longitudinal study by ONS, linkage study representing 1% of the population of England, Scotland and Wales Country of birth from 1971 Census. Northern Irish were not a separate group. Sample divided into first and second generation.	Second generation, with one versus two Irish-born parents	The rest of the sample 'all'. This included people born in England, Scotland and Wales and Northern Ireland. Unclear if it included	Deaths in a longitudinal survey from 1971-1989 were recorded. Mortality standardised for age and occupational class, car and tenure. Men aged 15-64, women aged 15-59 comprised the study sample.	1. Second generation Irish men and women had a higher standardised mortality ratio compared to the rest of the sample across all levels of socioeconomic position. 2. Age-adjusted mortality ratios were especially elevated in the younger age groups (age 15-65: men and women), relative to the rest of the sample. 3. All-cause mortality in most age groups elevated, as well as mortality for

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
			other migrant groups.		cancers (especially lung) in most age groups. 4. Suggestion that mortality was most elevated in people with two Irish-born parents>one Irish-born parent 5. Differences in mortality persisted despite adjusting for occupational class and tenure
Wild, McKeigue 1996 [19]	Census data from 1971 and 1991 (England and Wales) and 1991 (Ireland, Northern Ireland, Republic of Ireland). Country of Birth from death certificates was used. Immigrants from Scotland, Ireland, Indian subcontinent, Africa and Caribbean included. Republic of Ireland and Northern Ireland were	First generation	SMRs were standardised against population of England and Wales (five year age groups and sex) from 1989-1992	See previous column	1. IHD, Cerebro-vascular disease and lung cancer accounted for 40% of excess deaths in Irish migrants. 2. Mortality for lung cancer higher in Irish migrants than all other migrant groups. 3. Irish-born women showed a lower mortality ratio for deaths from breast

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	grouped together.				cancer 4. Irish-born migrants in England and Wales had a higher all-cause mortality and higher IHD mortality than Irish people in Ireland.
Raftery, Jones, Rosato 1990 [18]	Country of birth and country of parents' birth, Northern Ireland and Republic considered separately. Also included a 'born in rest of the world group' comparison.	First and second generation	Rest of the longitudinal sample	OPCS survey of 1% of people resident in England and Wales in 1971.	1. SMRs in Irish-born people (born in Republic or NI) elevated in youngest age groups (age 15-44). 2. SMRs in second generation Irish people (both parents Irish) elevated in 45-64 age group. 3. SMRs in people with only one Irish-born parent elevated in 15-44 age group 4. Gradient in social class- for each category of SEP SMR in Irish elevated to standard

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					5. Having two Irish-born parents appeared to be worse for SMR than having one Irish-born parent.
Rosenwaike, Hempstead1989 [69]	Deaths in New York City from 1979 to 1981. Mortality in Irish men and women resident in NYC in 1980 and between ages of 45 and 84.	First generation	Italian born and White NYC born (excluding Puerto Ricans)	Age specific and age standardised	1. All cause mortality elevated in Irish-born men (1.09*) and Irish-born women (1.08*) 2. By causes (Men): heart 0.95**, cancer (all) 1.14*, lung 1.20*, colon 1.22*, CVD 1.13*, pneumonia 1.11*, liver cirrhosis 2.25*, accidents 1.62*, diabetes 1.00 3. By causes (women): heart 1.08*, all cancers 0.83**, lung 0.83**, colon 0.67**, breast 1.02, CVD 1.56*, diabetes 0.62*, pneumonia 1.16*, liver cirrhosis 1.72*, accidents 1.37* 4. Also compared to Italian-born migrants- most causes of deaths were

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					greatly in excess
Adelstein et al, 1986 [61]	Deaths in England and Wales from 1970-1972. COB used to identify Irish-born migrants	First generation		Age standardised SMRs. Stratified by sex	1. Irish-born men in E&W have a higher SMR than Irish men in Ireland or population of E&W. 2. Death from suicide- SMRs (Irish-born men in E&W is 114, versus 47 in Ireland; Irish-born women in E&W is 127 vs. 23 in Ireland) 3. Deaths from accidental poisoning- Irish-born men in E&W: 269 vs. 65 in Ireland and Irish-born females in E&W: 177 vs. 41 in Ireland 4. Deaths from cirrhosis- Irish-born men in E&W: 163, vs. 125 in Ireland and Irish-born women in E&W: 159 versus 110 in Ireland 5. Social class gradient for mortality

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					evident for Ireland and for Irish migrants living in E&W, and a suggestion of interactions- at each level of social class mortality outcomes poorer for migrants
Marmot, Adelstein, Bulusu, 1984 [3]	Country of birth to identify Irish-born migrants	First generation	'non-immigrant' population	Data from the 1971 Census from England and Wales- examination of all people born outside of these two countries considered as immigrants. SMRs calculated with England and Wales as standard.	1. Compared to country of origin- 'all-cause' mortality (men) and deaths from TB, cancers of lung, and accidents and violence (both men and women), elevated in Irish-born people 2. Compared to SMRs for England and Wales, SMRs in Irish-born people elevated for: all cause, cancers of intestine (men), cancers of cervix (women), cancers of lung, TB, and accidents and violence (both men and women). 3. All-cause mortality stratified by social class there was a clear social

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					class gradient with SMRs for England and Wales forming the standard. Within each social class category Irish people had a higher SMR (interaction).

The studies displayed in Table 2-1, suggest several striking features:

1. The findings for mortality are remarkable in that they span a wide range of causes. Elevated mortality from cardiovascular disease and cerebro-vascular disease in Irish-born as well as in fourth or later generation Irish-descended people [17, 64] has been noted, whereas other studies have also noted excess mortality from cancers (lung, colorectal)[15][3, 65], suicide, accidental overdose and injuries [3, 11, 17, 70].

2. A similar trend of elevated all-cause mortality has been noted in studies of Irish-born migrants and second generation Irish people living in other countries. In studies from America [66, 69], a broad range of causes for mortality have been noted, including deaths from circulatory disease and cerebro-vascular disease [66, 69] and through liver cirrhosis, cancers and accidents [69]. Elevated suicide rates or attempted suicide have also been noted in Irish-born migrants to Australia, relative to Australian-born people [71, 72].

3. Mortality differentials have persisted into second, third and later generations of Irish-descended people and have not been fully accounted for through indicators of socioeconomic position [3, 9-11, 66].

4. In most instances these rates are elevated even when compared to rates in Ireland [3, 19, 61] as well as compared to the rates observed in other migrant groups settling in other parts of the world, (e.g. more elevated relative to Italian or Jewish migrants in the US) [69], or compared to other ethnic minority groups in Britain [67].

Self-rated health

Self-rated health is a close predictor for later mortality [73]. A systematic review and meta-analysis found that people reporting their health as *'poor'* had a two-fold increased

[15] Incidence of a number of cancers are also elevated in second generation Irish people relative to the rest of the population of England and Wales. This included cancer of the ovaries, cervix, lung and prostate (57. Harding, S., *The incidence of cancers among second-generation Irish living in England and Wales.* Br J Cancer, 1998. **78**(7): p. 958-961.)

risk of mortality, relative to people reporting their health as '*good*'[73]. In this section I focus on studies that have included this measure in assessments of health inequalities in Irish people. I have summarised these studies in the following table (Table 2-2).

Table 2-2: Studies examining self-rated health in first and second (or later) generation Irish-descended people

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
Moore et al 2012[49]	Sample was derived through purposeful non-proportional quota sampling to identify specific sub-groups, including second generation Irish people, Irish people in poor health and Irish people in middle and older age	First and second generation Irish (22.3% of the sample)	None	Mixed methods, qualitative and quantitative. Note quantitative estimates most likely biased due to sampling procedures.	Overall 25.8% of the sample reported being in poor health. Note problems with biased sampling.
Delaney et al 2011 [74]	Data from the Health Surveys for England (HSE) from years 1998, 1999, 2004	First generation	Irish people in Ireland and White English born in England	Both surveys are comparable in that they use similar methods and are nationally representative. Date of	1. Ratings of poorer self-rated health are more likely at the older ages for all three of the sample; however a larger proportion of older Irish-born people living in England reported bad health

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	to assess Irish-born population in England. Data from the Living in Ireland survey used for comparison, conducted in 2000.			birth is used to devise 'birth cohorts' however note this is not a longitudinal survey. Authors use height to determine early life adversity, and use measures for current self-rated health. Authors have shown trends in health by age but not assessed interactions by age (visual and descriptive presentation), or formally assessed between-group differences using statistics.	(axis is not clear- probably when aged 40-70), whereas lower proportions of Irish people in Ireland reported poor health for each age group, compared to the White English born in England sample. Especially marked for Irish-born men in England although Irish-born women in England have poorer health than Irish women in Ireland of comparable age 2. Suggestion that mean male height in Irish-born men and women living in England lower than both White English people and substantially lower than Irish people in Ireland, at each age band. NB. Interactions not presented- noted through graphs. The evidence for poorer education in Irish-born migrants being poorer compared to Irish in Ireland or English-born in England was less convincing.

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
Clucas, 2009 [47]	3% sample of records taken from the Census for England, performed in 2001. Irish sample size was 17,523 individuals aged over 16 and over. 'White British' sample comprised 1,037,770 people in base sample. Ethnicity was determined through self-report and COB was used. This allowed second/ later generation	First generation and second or later generation Irish people. Also people born in Northern Ireland who identified themselves as either 'White British' or 'White Irish'.	White British UK born people	Outcomes: Limiting long-term illness and general health. Author presents crude odds of self-reported poor general health in respondents relative to reference, and then ORs adjusted for age and gender, and finally ORs adjusted for age, gender, marital status, social class, education, tenure, industry type and household housing indicator.	1. Relative to 'White British' group 'White Irish born in ROI' (first generation) ORs for poorer self rated health was 1. OR: 1.81 (95% CI: 1.72-1.91) (crude); 2. OR: 1.38 (95% CI: 1.31-1.45) (adj. age and gender) and 3. OR: 1.12 (95% CI: 1.06-1.19) (adj. for age, gender, marital status and SEP) 2. Relative to 'white British' group 'White Irish born in NI' were 1. OR: 1.85 (95% CI: 1.60-2.13) (crude); 2. OR: 1.77 (95% CI: 1.53-2.05) (adj. age and gender); 3. OR: 1.62 (95% CI: 1.38-1.90) (adj. for age, gender, marital status and SEP) 3. Relative to 'white British' group 'UK-born White Irish' (second or later generation Irish) were 1. OR 1.13 (95% CI: 1.01-1.27) (crude); 2. OR: 1.42 (95% CI: 1.27-1.59) (adj. by age and gender); 3. OR: 1.49 (95% CI: 1.33-1.68) (adj. by

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	Irish people identifying themselves to be included in analysis. Note that second generation Irish people (through COB of parents) not identifying themselves would have been grouped in the 'White British'/ UK born group.				age, gender, marital status and SEP). NB: the potential misclassification of second generation Irish people would have led to a regression dilution bias (assuming they also have poor health), therefore these findings would have been more marked.

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
Smith et al, 2009 [55]	From HSE 1999 and 2004 for Irish participants and HSE 1998 and 2003 for White British participants. Samples were 'boosted' to derive adequate numbers of ethnic minority groups. Ethnicity was self-ascribed. Generational status was determined according to age of migration (<12 and born in Britain=second	First and second generation	White British	Main outcome: Self-rated health on five point Likert (very good, good, fair, poor and very poor). Adjustments for age, gender, socioeconomic position, health-related behaviours (diet, alcohol and tobacco)	1.Prior to adjustment for age and gender, second generation Irish people were less likely to rate their health as poor compared to first generation, but this disappeared after adjusting for age and gender (note younger age profile of second generation). OR (adjusted for age and gender): 0.84 (95% CI: 0.63 to 1.11). Very little changes after adjustment for socioeconomic position or health-related behaviours. 2. Very little difference between first generation and second generation for diet and smoking, although small differences for alcohol (see alcohol section of this table). 3. For rating their health as fair/ poor- compared to the White reference population first generation Irish were OR: 0.74 (95% CI: 0.51 to 1.07) and second generation Irish were OR: 0.95 (95% CI:

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	generation; >11 and born overseas=first generation).				0.78 to 1.15)
Becker et al, HSE 2004 [6]	Nationally representative cross-sectional survey of England performed in 2004 which 'boosted' or over-sampled for ethnic minority groups. Irish people identified through COB or parental country of birth. 6704	First generation and second generation	'general population'	Stratified by gender. Outcome: ratings of health, (bad/ very bad versus good/ very good)	1. Prevalence of 'bad' or 'very bad' self-reported health was roughly the same in HSE 1999 compared with HSE 2004 in Irish respondents. 2. Self reported health similar in Irish relative to White British group (n.b. ORs and 95% CIs approximate as plotted on a figure) Men OR: 1.5 (95% CI: 0.9-2.0), women OR: 0.8 (95% CI: 0.3-1.01) (all ORs have been age-standardised)

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	adults aged 16+ and 1650 children.				
Abbotts et al, 1997 [31]	Data from stratified random sample of households in the West of Scotland which including people who were 4^{th} / later generation Irish descended. Catholic religion was used to identify Irish-descended people.	Mostly later (fourth generation) but could also include third, second and first	Non-Catholics	Differences in health in Catholics versus non-Catholics. Confounders included gender and social class. Outcome: Poor self-assessed health (vs. excellent, good or fair).	1. ORs for poor self-assessed health (vs. excellent/ good/ fair) by age (Catholic relative to non-Catholic): (nb: (95% CIs not provided) (Unadjusted): Age 18: OR: 1.29, age 38: OR: 1.42, age 58: OR: 1.99 p=0.01 (Adjusted for gender and social class): Age 18: OR:1.29, age 38: OR: 1.34, age 58: OR: 2.12 p=0.01

Most of the studies displayed in Table 2-2 have tended to suggest poorer self-rated health in Irish people living in England, with the exception of the Health Survey for England 2004 [6]. Although gross differences in the self-ratings of health were not seen in Irish compared to White British respondents, a gradient with respect to income and poorer self-rated health was seen in the Irish group as well as in the White British group, in this survey, similar to the rest of the sample [6]. A secondary analysis of data from the HSE 1999 and the later 2004 survey further examined differences in first versus second generation Irish respondents with self-ratings of health [55]. There was a suggestion that second generation Irish people were less likely to rate their health as 'poor' relative to Irish-born respondents, however this difference disappeared after adjustment for age and gender, reflecting the younger profile of the second generation relative to the first[55]. This study did not find any gross differences between first and second generation Irish respondents or between first and second generation Irish respondents relative to White British respondents on this measure [55].

In contrast to the findings from the HSE surveys, other analyses have reported important differences. For example, a study using data from the Census in England in 2001 confirmed a higher odds of reporting poorer self-rated health in second generation Irish and Irish-born respondents, relative to the English-born population [47]. This study was noteworthy as it examined ethnicity according to self-report (rather than by 'country of birth') and found that people who reported their ethnicity as 'Irish' and who were born in Northern Ireland tended to have a higher odds of reporting their health as 'poor' relative to the White British reference population [47]. This study also found second generation Irish people to have a higher odds of reporting poorer self-rated health than the White British reference group [47]. For each of the groups examined, differences persisted, or in the case of the second generation group, were further accentuated, after adjusting for socioeconomic position and marital status [47]. The authors highlight that using a self-report measure of ethnicity (as opposed to 'country of birth' or 'parentage') has the advantage of assessing 'identity' components of ethnicity, such as connectedness with Irish culture or experiences of anti-Irish discrimination, whereas 'country of birth' measures are limited in that they can only assess structural

disadvantage[47][16]. The analysis from the Census had a very large sample size (n=1,055,293)[47], which may be why this study found differences in Irish-born and second generation Irish respondents relative to the White British reference, whereas the HSE surveys did not find differences[6]. Also the HSE analyses did not adjust for socioeconomic indicators[6] which the Census analysis was able to do [47].

In keeping with the analysis of Census data, an assessment of fourth generation Irish people living in the West of Scotland also suggested marked health inequalities. This study used religion to identify Irish descent, with Catholic religion taken as a proxy of Irish descent[31]. This study found that older Irish-descended people (Catholics) (aged 58) had just under a two-fold risk of reporting poorer self-rated health compared to non-Catholics, with this ratio increasing slightly after adjustments for socioeconomic position and gender[31]. Differences between the West of Scotland study and the HSE may also be a reflection of investigators adjusting for socioeconomic position in the former study[31] and not in the latter[6]. In addition, there may also be regional differences in health, potentially related to the specific historical and geographical settlement patterns of Irish people in Britain [42].

A novel study comparing findings of the HSE surveys from England with a comparable nationally representative survey of Ireland has also provided important insights[74]. This study found that larger proportions of older Irish people living in England reported their health as poor, compared to people of the same age who were English-born and living in England and Irish-born and living in Ireland [74]. Of note, mean height (a marker for childhood material adversity [75]) was much reduced in older Irish-born men and women living in England compared to both Irish-born people of a similar age remaining in Ireland and English-born men and women in England[74]. The authors

[16] 'Country of birth' or parentage measures of ethnicity also have some advantages, including the possibility of comparing ethnic minority groups across nations, as well as avoiding the problem of under-numeration of second generation ethnic minority groups, who may not identify with their parents' country of birth.

suggest that migration-related 'selection' (discussed further below) may account for poorer self-rated health in Irish-born people living in Britain [74]. This should be interpreted with caution, as it is also possible that the sample of surviving Irish-born migrants in Britain was not representative of all Irish-born migrants to Britain- especially if healthier migrants moved back to Ireland or migrated elsewhere[76].

In summary, although the HSE surveys did not suggest marked differentials for poorer self-rated health in Irish people living in England, other studies (including a study using Census data and studies looking at established Irish communities in the West of Scotland) have suggested that Irish-born and second/ or later generations of Irish people are more likely to report poorer self-rated health than the general population. In most cases these differences accentuate after adjustment for socioeconomic position. There is a suggestion that for Irish-born migrants, early life conditions (with height as a proxy of this [75]), were more harsh than that of Irish people who remained in Ireland and English-born people in England, which would lend some support to Marmot's selection thesis [3, 61], at least for the cohort of Irish-born migrants who are now older and living in England, and who migrated to Britain in the immediate post-war period.

Mental health and health-related behaviours

In this section I will summarise studies which have assessed mental health in Irish-born and Irish-descended people. Although suicide and self-harm will not be assessed in this thesis I have included a brief review of these studies here, because of the relationship with common mental disorders. Most work presented in this section has tended to focus on the Irish-born, with a few notable studies that have included (but not always analysed separately) the health of second generation Irish people [5, 6, 77, 78].

Common mental disorders (Depression and anxiety)

The following table (Table 2-3) presents studies that assessed common mental disorders and includes surveys of private households [6, 31, 59, 78], individuals [79], as well as enquiries based on hospital admission statistics [40, 58, 59, 62].

Table 2-3: Studies examining common mental disorders (depression and anxiety) in first and second (or later) generation Irish-descended people

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
Moore et al 2012[49]	Sample was derived through purposeful non-proportional quota sampling to identify specific sub-groups, including second generation Irish people, Irish people in poor health and Irish people in middle and older age	First and second generation Irish (22.3% of the sample)	Second generation group not compared	Mixed methods, qualitative and quantitative. Note quantitative estimates most likely biased due to sampling procedures. Depression and anxiety assessed through a single question 'Do you suffer from depression/ anxiety?'	12.2% of the sample depressed and 11.1% of the sample have anxiety. In the second generation Irish sample 28.4% reported anxiety or depression. Note problems with biased sampling and assessment of depression and anxiety in this study.
Delaney et	Data from the Health	First generation	Irish people	Both surveys are	1. Men and women- proportions

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
al 2011 [74]	Surveys for England (HSE) from years 1998, 1999, 2004 to assess Irish-born population in England. Data from the Living in Ireland survey used for comparison, conducted in 2000.		in Ireland and White English born in England	comparable in that they use similar methods and are nationally representative. Date of birth is used to devise 'birth cohorts' however note this is not a longitudinal survey. Authors use height to determine early life adversity, and use current measures for adult self-rated health and GHQ for mental health. Authors have shown trends in health by age but	in 'poor health' at the surveys- this was greater in Irish-born migrants born in period 1920s to 1960s (poorer than Irish in Ireland and White English-born) 2. Poorer mental health (GHQ scores) in men- similar trend to 1 noted. Irish-born migrants born in later periods (1960s onwards) have mental health which is closer to both English-born reference and Irish in Ireland reference. The mental health disadvantage is concentrated in people born in periods 1931-1950s. 3. Education and height also used to assess childhood- for

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
				not assessed interactions by age (visual and descriptive presentation), or formally assessed between-group differences using statistics.	people born between 1930-1970- Irish-born migrants shorter than Irish in Ireland and White English-born, differences in education are less clear.
Ryan et al, 2006 [79]	Community-based case-control study of Irish-born people living in London, between May 2002- July 2003. Participants aged >18 recruited through 11 GP practices. First name/ last name used to identify probable Irish	First generation	Controls were Irish people with no history of depression.	Main outcome: Scores of >14 on BDI indicating caseness for depression. Two groups assessed for risk factors for depression. Cases and controls were matched by GP	1. Depressed cases were much less likely to be married, more likely to be unemployed/ on sickness benefits, more likely to be living in a hostel or in council accommodation 2. Depressed cases were more likely to report discrimination, be smokers, and depressed Irish-

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	people who were then posted a screening questionnaire asking them their country of birth. HADS and three questions from CIDI used to identify depression. People scoring >11 on HADS invited for interview- re-assessed using the BDI.			practice, gender and 5 year age bands.	born men had a higher AUDIT score than controls. 3. Risk factors for depression were: (pre-migration) lack of preparation for migration, history of depression in Ireland, family history of depression, childhood emotional abuse (women only), (post-migration) poor social support, and unemployment, education, discrimination, acculturation and alcohol misuse.
Weich et al, 2004 [78]	Data from a nationally representative cross-sectional survey of people living in the community. The CIS-R	First and second generation	White British reference	Odds ratios for common mental disorders, stratified by age and gender	1. Relative to White British reference OR for CMD in men was: OR: 1.59 (95% CI: 1.11-2.28) (overall), by age: 16-34 years: OR 0.89 (95% CI: 0.34-

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	was used to assess for common mental disorders, scores of 11/12 denoted caseness for CMD. COB and parental Cob used to define Irish ethnicity.				1.80), 35-54 years: OR 2.12 (95% CI: 1.17-3.05); 55-74 years: OR 1.56 (95% CI: 0.74-2.55). 2. Relative to White British reference for females OR for CMD was: 0.98 (95% CI: 0.74-1.29) (overall), by age: 16-34: OR: 0.98 (95% CI: 0.74-1.29), 35-54 yrs: OR 0.94 (95% CI: 0.60-1.31), 55-74 yrs: OR: 1.07 (95% CI: 0.46-2.06)
Becker et al, HSE 2004 [6]	Nationally representative cross-sectional survey of England performed in 2004 which 'boosted' or over-sampled for	First generation and second generation	'general population'	Stratified by gender. Outcome: GHQ-12-scores of 4 or more to indicate CMD in 2004	1. OR for CMD (GHQ>3) in men (Irish versus 'gen population'): 1.10 (12% of Irish men 'case' for GHQ versus 11% of gen pop men, 2. OR for CMD (GHQ>3) in

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	ethnic minority groups. Irish people identified through COB or parental country of birth. 6704 adults aged 16+ and 1650 children.				women (Irish versus 'gen population'): 1.00 (15% or Irish women and 15% of 'gen population' were a case) 3. Comparison of GHQ prevalence in 1999 versus 2004 fairly comparable for Irish men and women'; prevalence had decreased by 2004 but this was comparable to the 'gen pop'. 4. Generational status not identified within the sample 5. Evidence of a 'gradient' by income present for Irish and the 'general population' although interactions not assessed.

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
Commander et al 1999 [59]	Survey of Irish-born people in West Birmingham Health District. All people aged 16-64 in contact with psychiatric services on a specified day and over the following six months. Also a random survey of private households, living in same regions, determined through GP databases. Authors report that they determined ethnicity according to OPCS criteria however refer to participants as 'Irish-born' implying that	First generation	'Remainder of whites'	SCID used for diagnoses in community (primary care sample) and hospital records for diagnosis of people in contact with services. Stratified by age and gender.	1. 7% of the sample were White Irish-born 2. 6-month period prevalence for psychiatric service use by depression in Irish-born men relative to White (age 16-44) OR: 2.0 (95% CI: 1.0-3.8). in Irish-born men (aged 45-65): OR 1.3 (95% CI: 0.7, 2.4). 3. 6 month period prevalence of psychiatric service use by depression in Irish-born women relative to White women, age 16-44: OR 0.9 (95% CI: 0.4, 1.8). (Age 45-65) OR: 1.3 (95% CI: 0.8, 2.1) 4. Affective disorders as assessed in the community-

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	COB was used.				phase of the survey showed no differences in Irish-born relative to White reference: OR 1.0 (95% CI: 0.3, 3.1)
Abbotts et al, 1997 [31]	Data from stratified random sample of households in the West of Scotland (mostly Glasgow area) which would have included people who were fourth/ later generation Irish descended. Religion (Catholic versus not) was used to identify Irish-descended people.	Mostly later (fourth generation) but could also include third, second and first	Non-Catholics	Mental health outcomes: CMD assessed using HADs and GHQ-12 as well as Dressler scale for psychosomatic symptoms.	1. Suggestion that magnitude of difference across all psychological measures was greater in Catholics versus non-Catholics 2. Prior to adjustment by gender and social class Catholics were 1.56 times more likely to report anxiety in the previous year (no 95% CIs but $p<0.05$) at age 58, this reduced to 1.49 after adjustment for gender and class 3. On question 'sadness or depression experienced v/ fairly

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					often) Catholics had an excess risk on both unadjusted and adjusted models (age 38: crude: OR 1.48; adj: OR 1.54; age 58: crude OR: 1.58; adj: OR 1.63; $p<0.05$ in all instances). 4. Differences on GHQ and HADS were less remarkable, although suggestion that psychological distress on these scores increased in Catholics (relative to non-Catholics) at older ages (age 58>38>18)
Cochrane & Bal, 1989 [58]	Use of routine data from DHSS on all admissions to England in 1981. There were 186,000 admissions.	First generation	Comparisons made to people born in England	Admissions to psychiatric in-patient units overall and by diagnosis, stratified by gender	1. All admissions for men in 1981 (REF: England-born: Depression: 79; Neurosis: 28)- men born in NI: Depression: 143, neurosis: 44; men born in

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	COB used to deduce Irish ethnicity				Ireland: depression 197, neurosis: 62. 2. All admissions for women (REF: England-born: Depression: 166 Neurosis: 56)- Women born in NI: Depression: 266, neurosis: 80. Women born in Ireland: Depression 410, neurosis: 111
Bebbington et al, 1981 [40]	Data from the Camberwell Case Register, which contained a large population of Irish migrants. The case register recorded all new admissions to hospital (to 1978) and	First generation	People born in United Kingdom	Rates of admission, crude and adjusted by age. Main outcome: Admissions to the Registry, broken down by diagnosis.	1. Mean admission rates for 'all affective disorders' (includes mania, severe and moderate depression): UK (REF): male-123.2, female-288.1; Ireland: male- 183.4, female-413.3. (rates for Irish have been age adjusted) 2. Mean admission rates for

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	all new episodes of mental disorders requiring contact with services. Diagnosis according to hospital records, but also interviews using PSE in community survey phase. COB to define ethnicity				'neurosis': UK (REF): male-23.3, female-40.9. Ireland: male-104.7, female-60.0 (nb. Also rates for 'contact with services' and 'point prevalence' available but not displayed here, although these showed a similar pattern).
Cochrane, 1977 [62]	Data from four sources used: 1971 Census, Country of Birth tables (from OPCS), report on in-patient statistics from the National Mental Health Enquiry, and information on country of birth (supplied by	First generation	People born in England and Wales (E & W)	Crude, age adjusted and age and sex adjusted rates (per 100,000 population) for admissions to hospitals in 1971 presented. Outcome: Admissions (first admissions and re-	1. Rates of psychiatric hospital admission were greatly elevated in people born in Ireland or Northern Ireland, compared to people born in England & Wales. 2. Men: Rates of admission for affective disorders (REF: 45 in

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	DHSS). Data from first admissions and re-admissions considered together.			admissions) to psychiatric hospitals, overall and according to diagnosis.	E&W), 78 in men from Northern Ireland and 69 in men from Irish Republic. 3. Women: Rates of admission for affective disorders (REF: 92 in E&W), 147 in women from Northern Ireland and 174 in women from Irish Republic.
Clare 1974 [80]	One year prevalence from the Camberwell Case Register (service contact data). COB used.	First generation	British-born patients	One year prevalence by diagnosis according to migrant group presented.	1. One year prevalence of affective disorders in Irish-born was: 14.6% vs. 7.2% in British ($p<0.001$) 2. One year prevalence of neurosis in Irish-born was 2.5% versus 1.61% in British-born (p=ns)

The earliest studies used data derived through hospital statistics [40, 58, 59, 62]. Most of these studies tended to suggest an elevated prevalence of affective disorders (as well as psychosis and other severe and enduring mental disorders) in Irish-born migrants [40, 58, 59, 62]. Two of these studies compared findings to a parallel sample of community-based individuals, but did not find an excess prevalence of common mental disorders in Irish-born migrants [59].

More recent evidence has come from nationally representative community surveys from England [6, 78], within which a sample of people who were of second generation Irish descent were also included. These surveys would have been less prone to health seeking biases or referral biases, although would have assessed 'milder' forms of mental disorders when compared to episodes captured through hospital statistics. The 2000 EMPIRIC[17] suggested that Irish men (which included Irish-born and second generation Irish men) had an increased risk of common mental disorders, as assessed through a structured, validated interview-administered scale, the Clinical Interview Schedule-Revised (CIS-R) [81]. In contrast, the Health Surveys from England (1999 and 2004), using the General Health Questionnaire-12 (GHQ-12), suggested that Irish people within the surveys were not more likely to screen positive as being a 'case' on the GHQ[6]. As with the general population, Irish people were less likely to screen positive as a 'case' on the GHQ-12 in 2004, when compared to an earlier HSE survey in 1999 [6].

As described in the previous section on self-rated health, a recent innovative study compared data from nationally representative datasets collected over the same time periods in Ireland and in England, and assessed height, self-rated health and common

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[17] *EMPIRIC: Ethnic Minorities Psychiatric Illness Rates in the Community Survey* was a nationally representative survey of 4281 individuals living in England in 2000. Irish people were identified through parents' country of birth or own country of birth (5. Sproston, J. and J. Nazroo, *Ethnic Minority Psychiatric Illness Rates in the Community (EMPIRIC): Quantitative Report.* 2002, The Stationery Office: London .)

mental disorders [74]. Older Irish-born people who would have migrated in the post-war years to Britain were more likely to have poorer mental health, as assessed on the GHQ, compared to Irish people who remained behind in Ireland or English people in England, over the same time period [74]. As mentioned previously, this survey also suggested that Irish-born migrants were more likely to have been exposed to childhood material deprivation relative to both Irish people remaining in Ireland and English-born people in England, of the same ages [74].

Suicide, attempted suicide and suicidal ideation

The contribution of death through suicide and accidental overdose to elevated all-cause mortality in Irish-born, second generation Irish and later generations of Irish-descended people has already been described in the earlier part of this chapter, which discussed mortality (Table 2-1) [9, 17, 61]. In the following section I consider this in light of studies where the primary aim focus was suicidality and completed suicide in Irish-born and Irish-descended people. Although it will not be possible to examine suicidality in this Study using data from the birth cohorts[18], this literature is briefly reviewed here nonetheless, given the robust associations of mental disorders (including common mental disorders) with risk of completed suicide [82], and suicidal ideas [77, 83]. The following table summarises studies relating to suicide and suicidal ideation in Irish-born and Irish-descended people.

[18] The Clinical Interview Schedule-revised (CIS-R) was administered in the biomedical sweep of NCDS but the questions around suicidality (which were not part of the original CIS-R but added on in previous national surveys from Britain) were omitted.

Table 2-4: Studies examining suicide and suicidal ideation in first and second (or later) generation Irish-descended people

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
Maynard et al, 2012[22]	COB to define ethnicity. Anonymised death records from the Office for National Statistics used to identify suicides over the period 1979-2003	First generation	Mortality rates directly standardised to Europe 2000 populations	Suicide determined through "intentional self-harm and events of undetermined intent" according to ICD-9 and ICD-10. Mortality stratified by gender and according to COB	Except for men born in Northern Ireland in the last period (1999-2003), rates of death from suicide were consistently higher ($p<0.05$) in men and women born in RI or NI for all time periods, relative to men and women born in England. Suicide death rates: Men from Northern Ireland: 1979-1983: 26.5 (21.5-31.4); 1989-1993:34.5(29.0-40.1); 1999-2003: 25.4 (20.5-30.3). (% change from first to last period: -4.2%) Men from RI: 1979-1983: 36.1 (32.4-39.7); 1989-1993: 33.4 (29.6-37.1); 1999-2003: 39.2 (33.8-44.7). (% change from first to last period:

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					+8.6%) Women from RI: 1979-1983: 18.7 (16.3-21.1); 1989-1993: 11.4 (9.5-13.4); 1999-2003: 12.2 (9.7-14.8) (% change from first to last period: -34.8%)
Crawford, et al, 2006 [77]	Nationally representative cross-sectional survey of ethnic minority groups living in England in 2000. Irish ethnicity determined through COB and parents COB.	First and second generation. Generation determined through 'age of entry to UK' (if <11 'second' >11 'first'.)	White British group (self-defined ethnicity), nb. Data on four other ethnic minority groups presented	Outcome: Previous year suicidal ideation or suicide attempt. Respondents aged 16-74. Note first and second generation were grouped together for analysis.	1. OR of lifetime thoughts of taking own life: Irish men relative to White British men OR: 1.79 (95% CI: 1.08–2.98) (crude). No differences for women. 2. Or of lifetime thoughts of taking own life, stratified by age: 16-34 OR: 0.72 (95% CI: 0.27–1.91); 35-54 OR: 2.79 (95% CI: 1.30–5.98); 55-74 OR: 1.09 (0.39–2.03). No differences for women. 3. Risk factors for predicting lifetime suicidal ideation in Irish

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					people (models adjusted for age, gender, social support, religion, employment, marital status, physical and mental health, racism, generational status and 'difficulties getting on with others'): Unmarried, longstanding physical illness, total CIS-R score, 'difficulties getting on with others'. Risk reduced in people aged 55-74 relative to age 16-24. 4. Second generation relative to first generation for lifetime suicidal ideation: OR: 1.23 (95% CI: 0.62–2.42)
De Ponte, 2005 [84]	COB to define ethnicity. Death certificates used to calculate SMRs by country of birth in England and Wales from 1999-2003	First generation	Rest of the population in England and Wales	Indirect standardisation to obtain SMRs. Outcome: Mortality through suicide.	1. Irish-born males; SMR: 139 (95% CI: 126-154); 2. Irish-born females: SMR: 140 (95% CI: 118-164); 3. All Irish-born migrants: SMR: 137 (95% CI: 125-149)

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
Neeleman et al, 1999 [85]	Recordings of all deaths by 'unnatural causes' in four boroughs in South East London, between 1st Jan 1991 and 31 Dec 1993. Ethnicity through coroner's/ forensic record photographs, COB to determine Irish people.	First generation	'All Whites not born in Ireland'	Many outcome: Suicide. Verified through coroner's report, suicide note left, or person had communicated intent or methods indicated suicide. Not age standardised, SMRs calculated using exact methods.	OR for suicide versus non-suicide verdict in Irish-born people relative to people born in England and Wales (crude): OR 2.4 (95% CI: I.05, 5.3); (adjusted for age and gender) OR: 2.3 (95% CI: I.01, 5.2) (adjusted for age, gender and means) OR: 2.7 (1.1, 6.7)
Maxwell & Harding, 1998 [67]	COB to determine ethnicity. All-cause and cause-specific mortality from 1991-1993 in England and Wales	First generation	SMRs standardised to 5 yr mortality for England and Wales	Age and sex-specific mortality for England and Wales used as the standard. Marital status was also adjusted for,	Excess all-cause and cause-specific mortality (suicide, in men and women from Republic of Ireland, but this reduced greatly after adjusting for marital status, the drop was most significant for suicide-associated mortality. In Irish women- SMR from suicide was 193 (140-265) which dropped

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					to 98 (72-134), after adjusting for marital status. In Irish men SMR from suicide was 185 (155-221) which dropped to 81 (66-99) after adjusting for marital status.
Merril & Owens 1988, [21]	Consecutive admissions of self-poisoning admitted to an in-patient unit in Birmingham over Jan 1st 1979 to Dec 31st 1980. COB used to define ethnicity.	First generation	People born in England (also data on Asian, West Indian, Scottish presented)	Stratified by age and gender and compared to the English-born group as reference using chi squared tests. Outcome: Admissions to in-patient unit for self-poisoning	1. Irish men and women had higher rates of self-poisoning, but these differences were most marked for Irish-born women. 2. Irish-born men (c/w English-born men) age 16-24: 635 vs. 390; 25-34: 662 vs. 406; <35 yrs: 156 vs. 131. Irish-born women (c/w English-born women) age 16-24: 1218 vs. 845; 25-34: 853 vs. 447 ($p<0.025$); <35yrs: 167 vs. 37($p<0.01$); <16yrs: 341 vs. 229 ($p<0.025$)

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
Burvill et al, 1983[72]	All deaths in Australia from 1962-1971. COB used	First generation	Suicide in Australia compared to home country (Ireland)- according to WHO estimates.	Suicide per 100,000 people in Australia, age standardised.	Ratio of suicides in Australia compared to Northern Ireland (men): 2.6; (women): 2.2. Republic of Ireland (men): 5.2; (women) 6.3
Burvill et al, 1983 [71]	Rates and methods of suicide determined through hospital in-patient records in migrants to whole of Western Australia from 1969 to 1978. COB used. Ireland and NI grouped together.	First generation	Australian born.	Age-standardised rates of attempted suicide, using Direct Standardisation. Outcome: Attempted suicide as determined through hospital in-patient records.	1. Ratio of age standardised attempted suicide (relative to Australian-born) in men was 1.29 (SE: 0.22) and women was 1.32 (SE: 0.17) 2. Attempted suicide to actual suicide rate in Irish-born men: 9.5, Irish-born women: 43.8. 3. Overdose most common means in both Irish-born men and women

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
Dean et al, 1976 [70]	Narrative review of a variety of sources including death registers (1970-1971) in England and Wales. 'Place of birth' of deceased noted.	First generation	Data from England, Wales and Northern Ireland	Male and female 'actual' suicide versus 'expected' presented, alongside age-specific bands. Outcome: completed suicide	1. Actual suicides in Irish-born men 183 versus 'expected' 157.3, actual suicides in Irish-born women 140 versus 107.7 'expected'; 1970-1972 2. Overall rates of suicide in England and Wales much higher than in Ireland and in Northern Ireland (1960-1973)

A consistent finding from the literature is that completed suicide rates in Irish-descended people are grossly elevated compared to the rest of the population in England, Scotland and Wales [61, 67, 70, 84, 86], or relative to the European population[22][19], with a similar finding noted in Irish-born migrants to Australia [72]. A challenge in making direct comparisons between countries relates to the recordings of suicide verdicts not being comparable. Rates of 'completed suicide' recorded in Ireland are likely to represent an underestimation [72]. Coroners may have been less likely to ascribe a suicide verdict as a result of strong religious[20] and social taboos[44], although there is a suggestion that this has been more recently corrected [44]. A further issue is in the under-recording of a suicide verdict in Irish-born migrants living in England, demonstrated in a study examining Coroner's verdicts on suicides in an ethnically diverse population in South East London [86]. Therefore it is possible that national figures for Irish mortality in Britain (as displayed in Table 2-4) represent gross under-estimations of the true mortality risk due to suicide in Irish people ([86] cited in [44]).

The findings relating to completed suicide have also been mirrored in studies examining suicide attempts. Studies from Birmingham in the 1970s/ 1980s using service contact data noted a large excess risk in Irish-born people of being admitted to in-patient units following attempted suicides [20, 21], which was especially elevated in Irish-born women [21]. The latter finding has been replicated in nationally representative data of hospital admissions for attempted suicide (cited in [44]).

In a more recent study utilising nationally representative community-level data from England, lifetime thoughts of wanting to take one's life were elevated in Irish-born and second generation Irish men but not in women, relative to a White British reference population [77]. This risk showed the largest elevation in men who were in their middle years (age 35-54), unmarried, had poor social support, co morbid physical illnesses, high anxious/ depressive symptomatology, or reported 'difficulties getting on with

[19] Albeit with a suggestion that rates of suicide may have fallen (in the period 1999-2003 compared with 1979-1983) in men from Northern Ireland and women from Republic of Ireland, but increased by 8.6% over the same time period in men from Republic of Ireland (Maynard *et al*, 2012).
[20] In Catholic faith, suicide is a mortal sin and the only one that cannot be healed through repentance

others' [77] (see Table 1). Of note, there was a suggestion that second generation Irish people (defined as 'born in the UK or aged <11 at the time of migration') had an elevated risk of life-time suicidal ideation (RR: 1.23; 95% CI: 0.62-2.42), although 95% confidence intervals were wide and spanned the null [77]. The findings relating to social support in this study[77] is consistent with one analysis which examined completed suicide in Irish-born migrants, which found that accounting for marital status in models greatly reduced elevated SMRs (in particular from suicide) in Irish-born migrants in England and Wales[67]. This might suggest an important role for social support and marital status in protecting from adverse mental health outcomes, which will be discussed in more depth later in this chapter.

Given that studies examining mortality through completed suicide in Irish-born migrants have continued to suggest marked elevations in data as recent as 2003[22, 84], considering the reasons which may drive this observation in Irish-descended people remains an important public health concern. Although suicidality cannot be directly examined in this thesis, as common mental disorders is associated with suicidality [77, 83] and associated with completed suicide [82], examining reasons for elevated common mental disorders in second generation Irish people may help in at least partially addressing this issue.

Childhood psychological health (emotional and behavioural health)

The following table summarises studies which have specifically examined childhood mental health in Irish and Irish-descended children living in Britain (Table 2-5). It can be seen that very few studies have assessed Irish children's psychological health (Table 2-5). Two studies on alcohol use in childhood [6, 87] have been reported separately in the section on alcohol misuse, below. As will be seen in the later sections of this thesis, an examination of Irish children's psychological health is of interest given the literature which suggests that childhood emotional and behavioural problems may predict downstream adult mental health problems[88], therefore from a life-course perspective this remains an important area of enquiry for this study, as it may have an important aetiological correlation with downstream adult mental health.

Table 2-5: Studies examining childhood emotional and behavioural health in first and second (or later) generation Irish-descended children

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
Fuller, 2004 [89]	Nationally representative survey from England (HSE 2004) which 'boosted' or over-sampled for ethnic minority groups. Irish people identified through COB or parental country of birth	First and second generation Irish children	'general population'	Outcome: Strengths and Difficulties Questionnaire (SDQ) completed by parents when children aged 5-14. Results were not standardised by age. GHQ-12 on children aged 13 to 15.	No differences in SDQ scores between Irish children and other children in the sample, or compared to the general population; 10% of Irish girls aged 5-14 scored in 'case' range versus 8% in 'general population' and13% of Irish boys were a 'case' versus 12% in 'general population' (NS).
Abbotts et al, 2001 [90]	Data from the West of Scotland 11-16 study. Baseline was in 1994 when 2586	Fourth or later although could include first, second and third	Non-Catholics	Outcomes: Rosenberg's 10-item 'global measure' to assess self-esteem. Kandel & Davies 6-item	1. Sex adjusted ORs for mental health (Catholic versus non-Catholic): 'felt nervous, worried or anxious' OR: 0.98 (95% CI:

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	school pupils (mean age 11) were enrolled. Parental questions asked about religion- Catholic children were considered to be of Irish descent.	generation		scale for depression. Teacher-rated the 'child at school' scale for emotional adjustment. Children were aged 11 to 16.	0.82, 1.17). 'felt sad, unhappy or low' OR: 0.96 (95% CI: 0.79, 1.15). 'Felt irritable or bad-tempered': OR: 1.46 (95% CI: 1.22, 1.75). 2. Differences in means in Catholic versus non-Catholics on mental health measures, adjusted for gender: Self-esteem score: 0.47 (95% CI: 0.10, 0.84). Depression score 0.19 (95% CI: -0.12, 0.50). Social Anxiety score: -0.04 (95% CI: -0.25, 0.17). Aggressive behaviour: 0.16 (95% CI:-0.05, 0.36) 3. Catholic children were much more likely to live under circumstances of marked material

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					adversity or be of a lower social class and also had a lower mean height than non-Catholics
Nazroo, 1999 [91]	Nationally representative survey from England (HSE 1999) which 'boosted' or over-sampled for ethnic minority groups. Irish people identified through COB or parental country of birth.	First and second generation	General population	Children aged 13-15 interviewed in person, children aged 2-12: parents asked questions on their behalf. GHQ in children >12, SDQ on children aged 2-12	1. No differences in GHQ scores for Irish children compared to rest of the sample or the reference. 2. Larger proportion of Irish girls (14%) more likely to score highly on the total SDQ compared with the 'general population' (8%); 8% of Irish boys were high scorers on total SDQ versus 10% in the 'general population'. 3. On sub-scales Irish boys were less likely to have Emotional Symptoms, Peer Problems and low Prosocial Scores. Irish girls had a higher conduct score than the 'general population'.

Two of the studies included a sample of first and second generation Irish children in a nationally representative survey of ethnic minority groups living in England in 1999[91] and in 2004[89]. Although the more recent survey in 2004 did not suggest differences in emotional and behavioural health problems in Irish children relative to the 'general population' reference[89], the earlier survey in 1999 suggested that a larger proportion of Irish girls in the younger age groups had higher total scores on the Strengths and Difficulties Questionnaire (SDQ) compared to the 'general population' reference [91]. Authors of the later HSE noted that in general, psychological morbidity in all ethnic minority children had improved in the later survey compared with the earlier one [89]. Neither study controlled for socioeconomic position. The third study examined the emotional and psychological health of Catholic children- predominantly of fourth generation Irish descent, living in the West of Scotland[90]. The authors noted that despite living in adverse material social circumstances Catholic children within this survey had health on par with non-Catholic children [90].

Therefore in general, unlike studies of adult health, the three studies retrieved examining child health (which would have tended to include second and later generation Irish children) suggested a relatively favourable psychological health profile.

Hazardous alcohol use, misuse and dependency

Alcohol misuse and dependency (and indeed any behavioural factors in accounting for health inequalities) in the Irish community is a difficult and contentious area to consider. The stereotype of the 'Irish alcoholic' is an unwelcome labelling of Irish people which obfuscates the wider agenda on health inequalities and is also potentially detrimental to policy. For example, one commentator has suggested that research which implicates behaviours such as alcohol misuse in morbidity and mortality statistics carries with it the implication that "the Irish in England do not behave and they pay for it by death" [92].

Attributing all health disadvantage to alcohol or other health-related behaviours may miss other causes for health inequalities in Irish people[2]. At the level of service use, Irish people themselves may feel that they are being unfairly stereotyped and

discriminated against [93]. Of course this is not just specific to Irish people, parallels are seen when examining other ethnic minority groups where the 'culture' of the ethnic minority group in question is thought to be the culprit for any observed health differences, usually at the expense of considering other health problems or aetiological mechanisms [2, 94]. In some cases this may become distorted in the media, which may be of further detriment to race relations [2]. However to avoid this topic because of concerns over stereotyping may also be of a disservice to Irish communities in Britain, as, potentially this could have important public health implications [95, 96].

To understand patterns of alcohol use in Irish people living in Britain, it is helpful to also consider usage patterns in Ireland, particularly because of related literature on acculturation, discussed further below. Only one study has compared rates of alcohol-related admissions in Ireland to those in England [97]. A study conducted in the 1990s suggested that per capita consumption of alcohol in Ireland was amongst the lowest of all European countries surveyed (cited in [96]). However, later research has suggested that this picture has rapidly changed within the last few years. A nationally representative survey of adults living in Ireland conducted in 2002 suggested that compared to other European countries[21] Irish men and women were more likely to report weekly binge drinking (eight or more units in one sitting) compared to men and women from all of the other European settings surveyed, although reported frequencies in UK respondents were similar [98]. Ireland also had the highest rates of abstention, compared to all of the other European countries [98]. This combination of high rates of abstention with high rates of binge alcohol use has also been noted in studies of Irish people living in Britain and is discussed further below.

In this section I will consider studies that have examined alcohol-related morbidity and mortality in Irish people living outside of Ireland. The following table highlights particular studies of interest (Table 2-6).

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[21] The authors compared drinking patterns in Ireland to that of Sweden, Finland, Germany, UK, France and Italy (Ramstedt & Hope, 2005)

Table 2-6: Studies examining alcohol use and misuse in first and second (or later) generation Irish-descended people

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
Smith et al, 2011 [56]	Analysis of the HSE (1999 and 2004) which was 'boosted' to oversample for ethnic minority groups. Comparative data for White English from 1998 and 2003 HSEs.	First and second generation; first generation were foreign born and migrating to UK when aged 12 or older. Second generation were UK born or foreign born and migrating when <12	White English and also second generation compared to first generation	Outcome: 'Ever drank alcohol in the past week', analysis comparing first and second generation to White British. ORs adjusted for age and gender.	On the outcome' ever drank alcohol in the past week', relative to the White British group the Irish-born sample had a reduced odds of reporting this; OR: 0.69 (95% CI: 0.56-0.85), but the second generation group were of a similar odds: OR 1.01 (95% CI: 0.87-1.18) [all ORs have been age and gender adjusted].
Bhala et al, 2010[99]	Data from the General Register Office for Scotland (GROS) from 2000-2004. Alcohol-related mortality encoded	First generation. Likely the 'Scottish' population comprised many	Age and cause-specific mortality data for Scottish-	Indirect standardisation to correct for age distributions	1. Alcohol-related mortality in Irish-born comparable to the Scottish-born (note in previous reference Scottish-born in E&W also had largely elevated SMRs)

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	according to ICD-10. COB for ethnicity	second/ third/ fourth generation Irish people	born taken as standard		2. SMRs- for NI-born (female): SMR: 89 (95% CI: 46-155) (male) SMR: 65.6 (95% CI: 41-100). For Irish-Republic born: females SMR: 79.5 (95% CI: 38-146), males SMR: 109.2 (95% CI: 73-157)
Bhala et al, 2009 [100]	Analysis using 2001 Census data and deaths from 1999 and 2001-2003, by age, sex. Data for England and Wales. Data on alcohol-related deaths according to ICD-10 and for hepatocellular carcinoma. Ethnicity by COB and includes people from NI.	First generation	Cause-specific mortality for E&W for 1999 & 2001-2003 by sex and 5-year groups as the reference.	Indirect standardisation to correct for age distributions.	1. Alcohol-related deaths grossly elevated in the Irish-born but not for hepatocellular cancer; 2. For alcohol-related deaths: men- SMR: 230 (95% CI: 220-258); women: SMR: 230 (95% CI: 190-230)

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
Smith et al, 2009 [55]	Analysis of the HSE (1999 and 2004) which was 'boosted' to oversample for ethnic minority groups. Comparative data for White English from 1998 and 2003 HSEs.	First and second generation; first generation were foreign born and migrating to UK when aged 12 or older. Second generation were UK born or foreign born and migrating when <12	White English and also second generation compared to first generation	Age and gender adjusted.	1. Second generation Irish had a higher odds of reporting 'any drinking' relative to first generation; Adj, for age and gender: OR 1.23 (0.95-1.59). But note that this was more elevated in all of the other second generation ethnic minority groups relative to the first (Chinese, Black Caribbean, Bangladeshi, Pakistani, Indian) 2. Second generation reported slightly more drinking days/ week than first generation, but this was comparable to the White reference 3. % reporting alcohol frequency: First generation Irish: none-34.7%, 1-3 days/ week: 40.1%; 4-

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					7 days/ week: 25.2%; Second generation Irish: none-25.4%, 1-3 days/ wk: 46.3%, 4-7 days/ wk: 28.3%. White reference: None: 24.6%, 1-3 days/ week: 48.5%, 4-7 days/ week: 26.9%
Rao et al 2008 [101]	Participants aged over 65 recruited from day centres- with one day centre exclusively for Irish people used. Sampling from day centres were probabilistic using SRS. Sampling stratified by gender (male: female ratio 2:3). Unclear how ethnicity determined.	Unclear- possibly comprised mostly first generation Irish people	People of 'English origin'	Main outcomes: Short Michigan Alcoholism Screening Test-Geriatric Version (SMAST-G), AUDIT and SF-36. Questions on frequency and quantity of alcohol drunk in last month, year and life-time also asked. ICD-10	1. Irish respondents were more likely to have a family history of mental health problems (alcohol and depression; 14/30 in Irish group and 3/30 in English group; p=0.001). Irish more likely to have a previous psychiatric history (15/30 in Irish group vs. 8/30 in English group; p=0.06). 2. No difference in the two groups with lifetime mean weekly alcohol intake, although Irish

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
				questions for depressive disorder used.	group had a higher mean weekly alcohol intake in previous year compared to English group (6.4g vs. 2.4g; MW test p=0.01). 3. Bimodal distribution of alcohol intake for the Irish group- with peaks at daily consumption (just over 20%) and less than monthly consumption (just over 20%) or never (just under 20%). 4. Irish group more likely to report binge drinking (8/30 in Irish vs. 1/30 in English; p=0.03 Fisher's exact test), and also more likely to drink above recommended weekly units (9/30 Irish; 1/30 English, p=0.01), both p values became larger after

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					Bonferroni correction
Becker et al, 2006 [6]	Nationally representative cross-sectional survey of England performed in 2004 which 'boosted' or over-sampled for ethnic minority groups. Irish people identified through COB or parental country of birth. 6704 adults aged 16+ and 1650 children.	First generation and second generation	'general population'	These are the findings related to adults (age 16+) Outcomes: 'Usually drank on 3 or more days a week'. Binge alcohol use (more than 8 units in one sitting- men and more than 6 units in one sitting for women). All results stratified by gender, and presented unadjusted + adjusted by age. Authors also	1. 51% of Irish men and 30% of Irish women drank on 3 or more days a week, note for general population this was about 42% of men and 26% of women5 Marginally more mean days of alcohol intake in Irish (3.0 days for men and 2.1 for women), versus general population (2.7 for men and 1.8 for women). 2. Self-reported drinking frequencies in Irish group were the same from 1999 to 2004. 3. For the general population there was a reverse social class gradient- that is highest income tertile were least likely to be non

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
				compare to findings from HSE 1999	drinkers or occasional drinkers compared to the lowest tertile. A similar gradient was seen for Irish men and women. 4. After standardisation by age, proportions reporting that they had drunk on at least one day in the previous week was the same in the Irish and general population. 6. Binge drinking- 32% in Irish men, 25% in gen pop. Differences significant after standardisation for age. Women- Proportions binge drinking was similar in gen pop (14%) and in Irish women (16%). Irish men in the higher income tertile were more likely to

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					binge drink than general population after standardisation
Becker et al, 2006 [6]	Nationally representative cross-sectional survey of England performed in 2004 which 'boosted' or over-sampled for ethnic minority groups. Irish people identified through COB or parental country of birth. 6704 adults aged 16+ and 1650 children.	First generation and second generation	'general population'	These are the findings related to children (aged 8-15) in the HSE. Children asked if they had ever drunk alcohol, and if responded 'yes' to report when, how often and when last drank.	1. 43% of Irish boys and 54% of Irish girls had drunk alcohol previously, c/w 45% boys and 40% girls in general population. 2. Comparing HSE 2004 to HSE 1999- proportion of Irish girls who had drunk alcohol was higher than in 1999 (54% compared with 40%).
Stillwell et al 2004 [87]	Cross-sectional schools-based survey of 14-16 year olds living in Brent. Year 10 pupils in three schools invited to participate in face-to-face interviews.	Could include first, second or later generation Irish children	White English group as well as Black Caribbean and Black	Outcomes: 1. Current frequency of alcohol use in the last 3 months 2. Frequency of being intoxicated in prev 3	1. Results for Irish children and English children comparable, although clear differences in these two groups compared with the other two ethnic groups (which were Black African and Black

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	Respondents asked to define their ethnicity and could report 'White Irish', 'White English' or 'White other'. Religious affiliation also asked		African group	months. 3. Negative consequences as a result of alcohol use enquired after.	Caribbean) 2. Irish boys vs. English boys: 'ever consumed a whole drink' Irish: 88.1%, English: 88.6%; recent alcohol use Irish: 69% vs. English 82.9%; mean days alcohol use in last 3 months Irish-14.5 vs. 11.1 in English, % 'drunk' in prev 3 months: Irish-58.6% vs. 53.4% in English. 3. Irish girls vs. English girls: 'ever consumed a whole drink' Irish: 94.6%, English: 89.1%; recent alcohol use Irish: 86.5% vs. English 82.6%; mean days alcohol use in last 3 months Irish- 11.7 vs. in English 14.9, % 'drunk' in prev 3 months: Irish-48.4% vs. 65.8%

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					in English.
McCambridge et al 2004 [102]	Convenience samples of two pubs- two in London and two in Dublin. COB for ethnicity. All data collected over a period of a month in 2001	First generation	Convenience sample of Irish people in Dublin pubs	Outcomes: Questions on the AUDIT and the SADD (Short Alcohol Dependence Data) and questions on frequency and quantity. Confounders: age, sex, marital status, education, family history of alcohol problems, and total expectancy score	1. In week prior to collection mean alcohol consumption was 63 units in London sample c/w 43 in Dublin sample; p=0.01. Mean no. of days alcohol consumed was 14 for Dublin and 20 for London; p=0.001. Quantities consumed and 'no. of times drunk in past month' were similar in the two sites. 2. 43% of the Dublin sample were 'high' consumers of alcohol vs. 64% of London sample; 21% of Dublin site were 'low' consumers vs. only 4% of London site (p=0.004) 3. No differences in mean AUDIT

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					scores or proportions reaching case thresholds, although in multivariate regression analyses London site were more likely to have hazardous drinkers (β=0.19; p=0.012)
Harrison and Carr-Hill, 1992; cited in Foster, 2003 [96]	(Unable to get the original report) 3 samples obtained- 1. Irish day centre attendees (62% response rate with 138 men and 109 women), 2. 60 men and five women recruited from a hostel for the homeless, response rate was 65% of those approached, 3. Migrants travelling on a ferry from	?First generation	? population of English-born people	Unknown	1. Two 'types' of population of Irish-born people identified- the first mirrored receiving country population and comprised people living in stable accommodation (rented or owner-occupied) the second represented more transient and socially unstable group, who were poorly educated and mostly male. 2. The second group had a more alcohol problems than the

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	Ireland to England 34 men and 8 women (100% response)				receiving country population in the context of social problems 3. Alcohol problems deteriorated on arrival to Britain
Erens & Laiho, 2001 [103]	Nationally representative survey of individuals living in England, over the age of 2, the sample was 'boosted' for ethnic minority groups. Included children in the sampling. 7798 interviews with general population which included 695 from ethnic minority groups, 5487 people in 'ethnic boost' sample. COB and parental COB used for ethnicity	First and second generation	'general population'	Most findings presented stratified by ethnic group, gender and age. Main outcomes: frequency of use and quantities drunk, and abstinence. Drinking in past week. All measures self-report.	1. 7% of general population non-drinkers vs. 5% of Irish respondents were non-drinkers. 2. Mean consumption in Irish men and general population similar- 30% drank more than 21 units/ week (general population) versus 34 % drank more than 21 units/ week (Irish); mean use (Irish) 20.4 units/ week, general population 17.4 units/ week. Age adjusted risk ratio for drinking >21 units was 1.13

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					3. In general population women 16% drank>14 units/ week, which was 19% in Irish women. Mean consumption was 7.2 units/ week in gen pop versus 8.5 units/ week in Irish women 4. Across all groups levels of alcohol consumption decreased with age 5. 59% of male drinkers (gen population) drank >4 units on heaviest day versus 74% in Irish men 6. 47% of general population women drank >3 units on heaviest day versus 56% of Irish women

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
Canning et al, 1999 [104]	Assessment of in-patient admissions to King's- patients had to be resident in Lambeth. Lewisham or Southwark and aged 18-85. Unclear how ethnicity was determined, although study claims according to 1991 Census. Unclear if interviewer-ascribed or self-ascribed.	Unclear. NB. The 'Irish' category did not appear until the 2001 Census.	White	AUDIT used to screen for 'at risk' drinking in a medically admitted hospital in-patient population in SE London.	1. Irish in-patients were likely to screen positive for alcohol misuse. OR: 2.1 95% CI: 1.42-3.05 After adjusting for age gender and marital status
Commander et al 1999 [59]	All people aged 16-64 in contact with psychiatric services on a specified day and over the following six months. Also a random survey of private households, living in same regions, determined	First generation	'Remainder of whites'	SCID used for diagnoses in community (primary care sample) and hospital records for diagnosis of people in contact with services. Stratified	Odds ratios for psychiatric service use for alcohol disorders, stratified by age. Irish-born people relative to White (ref): 1. Age 16-44; [ORs (95% CIs)]; Men: 6.0 (3.5-10.1); Women: 4.1 (1.4- 11.9) 2. Age 45-64; [ORs (95%

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	through GP databases. Ethnicity determined according to OPCS criteria			by age and gender.	CIs)]Men: 2.6 (1.5-4.4); Women: 4.9 (1.1-21.7) 3. Odds ratio for alcohol use disorders (in men and women) for the community survey (Irish-born relative to White (ref)): OR: 4.2 (95% CI: 0.8-22.3)
Foster et al, 1998 [105]	Analysis of relapse at 12 weeks after discharge in 60 alcohol dependent adults admitted to an in-patient unit for detox. Unclear how ethnicity defined.	Authors state all were Irish-born	Proportion of ethnic minority individuals in 'relapse' compared to 'non-relapse' group	Outcome was relapse at 12 weeks.	A larger proportion of the people in the 'Relapse' group following in-patient detox were Irish (33% in relapse group versus 4% in non-relapse group). Chi squared p=0.01
Harrison et al, 1997 [68]	Data on cause of death according to ICD-10 diagnoses for all alcohol and substance misuse	First generation	South Asian & Caribbean groups	SMRs calculated standardised to age and sex structure of the population.	1. SMR for alcohol-related mortality in Irish-born was 252.1 (95% CI: 222.6, 285.5) (note excess compared to Caribbean-

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	categories obtained from OPCS for 1979-1991. COB for ethnicity.			Proportional Hazards model assumed.	born SMR: 115.1 (95% CI: 86.7-152.7) and South Asian-born SMR 157.7 (95% CI: 133.5, 186.3) 2. In comparison of SMRs in 1989-1991 compared with 1979-1982 ratio of SMR in more recent period to previous time period in Irish-born was 1.21 (95% CI: 1.01-1.47).
Mullen et al, 1996 [106]	Data from West of Scotland 07 study- SRS sample of households in West of Scotland. Names and religion (Catholicism) used to determine Irish ancestry	Mostly third and fourth generation, may include other generational groups.	Non-Catholic or people not of patrilineal Irish descent	Note qualitative insights from this paper (mixed methods) Adjusted for social class and assessed	1. Little difference in drinking patterns in Scots of Irish descent and other Scots. No differences in alcohol use after adjustment for social class. 2. By current religious affiliation (prev analyses were born affiliation and surname): 64% of

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
				interactions. Results presented stratified by gender.	Catholic men were moderate or heavy drinkers vs. 49% of Protestants and 60% non-religious men ($p<0.05$). 3. By current religion-For women: 32% of Protestant women, 37% Catholic women, and 49% of non-religious were moderate/ heavy drinkers $p<0.05$. A suggestion of attenuation in HRBs by third/ fourth generations
Greenslade, 1995 [107]	Data from the General Household Surveys (GHS) for the years '84, '86, '88. GHS is a nationally representative survey. Data was from 10,000 households containing	First and second generation; further divided by birth in Northern Ireland (NI) versus Republic	Those born in Britain of British parentage	Main outcomes: Alcohol use-'Do you ever drink alcohol nowadays, including drinks you may brew at home?' Weekly quantity in units also	1. 'current drinking' levels equivalent across all groups (British and all Irish groups) i.e. no difference 2. Rates of drinking greater than recommended levels; men:

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	25,000 individuals.	of Ireland (RI)		determined (>14 for women and >21 for men). Stratified by gender and standardised by age and social class.	(British REF: 98 (95% CI: 95-103)), RI: 118 (86-111), RI-British: 128 (102-155), NI: 115 (62-169), NI-British 119 (77-161) (i.e. all confidence intervals overlap, although second generation RI-British slightly higher). 3. Rates of drinking greater than recommended levels in females: (British REF: 98 (93-103), RI: 123 (82-105), RI-British 113 (82-145), NI 201 (110-291). NI-British 126 (68-185), i.e. greater in females born in NI Authors conclude, on further analyses that women in the sample bigger alcohol consumers

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					than men
Cochrane & Bal, 1989 [58]	Use of routine data from DHSS on all admissions to England in 1981. There were 186,000 admissions. COB used to deduce Irish ethnicity	First generation	Comparisons made to people born in England	Admissions to psychiatric in-patient units overall and by diagnosis, stratified by gender Authors also highlight the problem of diagnosis- either by treating doctor or by the clerk on the records office, could lead to misclassification.	Admission rates for alcohol abuse in 1981 (of all admissions- first admission + other) 1. Men: England-born (reference): 38; born in Northern Ireland: 261; Ireland-born: 332 2. Women: England-born (ref): 18; born in Northern Ireland: 90; born in Ireland: 133 3. Admission rates for alcohol abuse in Irish-born people is about equivalent to Scottish-born people

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
Taylor et al, 1986 [108]	All emergency admissions to medical or surgical wards over Oct 1,1984 and Jan 31, 1985. COB for ethnicity.	First generation	People born in England	Outcomes: Michigan Alcohol Screening Test (MAST) interview	1. Of acute hospital admissions with alcohol-related conditions, a large proportion were Irish-born (34.5% Irish-born versus 9.3% English-born)
Balarajan & Yuen, 1986 [109]	Analysis of General Household Survey data, 1978 and 1980 sweeps. Information on 21764 males and 24176 females, aged 18 or over. COB used	First generation	Results standardised by SEP and age with Great Britain as standard for heavy drinking ≥36 units/ week	Information on age, sex available, as well as current smoking history (not presented here). Outcome: 'heavy drinking' (≥36 units/ week (men) and ≥29 units/ week (women).	Standardised drinking rates by COB: England: 103, Scotland: 103, Wales: 113, Ireland: 131 *note these are standardised against whole of Great Britain for heavy drinking.
Muhlin, 1985 [110]	2504 people foreign-born psychiatric in-patients admitted to a hospital in	First generation	None- rank of alcohol-related	Alcohol-related diagnoses was the main outcome,	Rates of alcohol-related diagnoses were very prevalent in Irish-born in-patients, although note almost

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	New York, United States of America in 1970. COB for ethnicity.		diagnosis in all foreign-born people, note Americans were not included in the analysis	findings stratified by gender.	as elevated (and for women-more prevalent) in UK expats living in New York. 1. Irish-born Men: 51.3% had an alcohol-related diagnosis (compared to 32.1% of UK-born men), Irish-born men had the highest prevalence of alcohol-related diagnoses of all men. 2. Irish-born women: 11.8% with an alcohol-related diagnosis versus 12.2% of UK-born women (in this case UK-born women had the highest prevalence of alcohol-related diagnoses)
Dean et al, 1981 [97]	Data based on the English county Census reports for 1971 and on the 'Activities	First generation	Rates standardised to first	Age and sex standardisation. Results were also	Rates of first admission in Irish-born in England were midway between English-born in England

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	of Irish Psychiatric Hospitals and Units 1975 and 1976'. COB used for ethnicity-birthplace recorded for 91% of people.		admission rates in Ireland and to first admission rates in English-born in England.	presented by marital status. -Authors suggest that results could be due to differing service provision and diagnoses in Ireland compared to England, so caution required in interpreting results. Outcomes: First admission rates to psychiatric in-patient units by diagnosis	(who had the lowest admission rates) and Irish in Ireland (who had the highest rates). 1. (Using age-specific rates for people born in England to calculate 'expected'). First admissions for alcoholic psychosis and alcoholism: Men- expected no. 21.5 versus actual no. 115 ($p<0.001$). Women- expected no. 10.4 vs. actual no. 44 ($p<0.01$). 2. (Using age-specific rates for people born in Ireland to calculate 'expected'). First admissions for alcoholic psychosis and alcoholism: Men- expected no. 304.5 versus actual no. 115.

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					Women- expected no. 79.1 vs. actual no. 44
Cochrane, 1977 [62]	Data from four sources used: 1971 Census, Country of Birth tables, report on in-patient statistics from the National Mental Health Enquiry, and information on country of birth. Data from first admissions and re-admissions considered together.	First generation	People born in England and Wales	Crude, age adjusted and age and sex adjusted rates (per 100,000 population) for admissions to hospitals in 1971 presented. Outcome: Admissions (first admissions and re-admissions) to psychiatric hospitals, overall and according to diagnosis.	(All are rates / 100,000 from age 15): 1. Men- (England and Wales born (reference): Alcoholism/ alcohol psychosis: 28; Northern Ireland: 349; Irish Republic: 265 2. Women (England and Wales born (reference): Alcoholism/ alcohol psychosis: 8; Northern Ireland: 69; Irish Republic: 54 3. Notes rates were also elevated in Scottish-born migrants (both

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
					men and women)
Clare 1974, [80]	One year prevalence from the Camberwell Case Register (service contact data). COB used.	First generation	British-born patients	One year prevalence by diagnosis according to migrant group presented. Structured assessment was made to review the accuracy of the diagnoses.	1. Prevalence per 1000 of alcoholism in Irish in-patients was 44 (7.33%) and British-born 237 (4.2%) $p<0.001$. Following structured diagnostic reassessment this prevalence in Irish-born respondents became higher.
Bagley & Binitie, 1970 [111]	Data from the Camberwell Case Register which recorded in-patient and out-patient contacts within Camberwell (population 175,000).Two year period from 1966 to 1967	Probably First Generation	English-born	Comparison of two groups on diagnoses which was through Case Registry. Unclear how they selected the two groups for	1. Authors note a higher proportion of the Irish patients had an alcohol related diagnosis compared to the English-Born patients (18/134 in Irish vs. 3/134 in English).

Reference	Sample/ method of defining Irish ethnicity	Generational status of Irish group in study	Comparison group	Methods, outcomes, confounders, interactions	Main findings
	covered, people aged 15-64. New episodes of illness. Method to determine ethnicity unclear- probably COB			comparison from the Registry. Note diagnosis would have been as recorded in the notes- the authors note the possibility of the Psychiatrist's 'cultural perception of the Irish patient'.	2. Authors compare symptoms of Schizophrenia in the two groups and find a higher prevalence of symptoms in the Irish group which they suggest might be 'masked' by a co morbid alcohol diagnosis.

Many of the studies on alcohol use cited in Table 2-6, especially those concerned with mortality statistics [68, 99, 100] or with hospital episode data where alcohol-related medical complications or admissions to psychiatric in-patient units by alcohol-related diagnoses were assessed [58, 59, 62, 97, 104, 108, 110], have focused on first generation Irish migrants. This might relate to the ease at which 'country of birth' data is collected in these settings. This has meant that research examining patterns of alcohol use in second generation Irish people living in Britain is generally lacking[96].

The studies highlighted in Table 2-6 also underline the importance of considering context when examining alcohol use in Irish-born people. For example, one study examining alcohol-related co morbidity in Irish-born people admitted to a psychiatric in-patient unit in New York suggested that UK-born expatriates had rates of alcohol-related diagnoses which were either comparable, or for women, greater than Irish-born counterparts [110]. Another pair of studies compared alcohol-related mortality in Irish-born migrants living in England and Wales, as well as in Scotland [99, 100]. Whereas the study of migrants to England and Wales suggested that alcohol-related mortality was of a similar rate in Irish-born migrants to that of Scottish-born migrants [100], the study of migrants to Scotland suggested that alcohol-related mortality in Irish-born migrants was either comparable or, (for the case of men born in Northern Ireland), slightly lower than that of Scotsmen [99]. Therefore the picture which emerges is more complex than initially suggested. One other issue concerning data from hospital episode statistics is the problem of measurement bias. If doctors or hospital staff have a pre-conception of alcohol misuse being more widespread amongst Irish migrants then this diagnosis may be recorded preferentially[80].

Alcohol use in Irish adults and children living In England, was assessed in three studies using data from the Health Surveys for England [6, 55, 103]. These had the advantage of being nationally representative of individuals living in private households in England, and used the same methodology to assess alcohol use and other health indicators across all ethnic minority groups[6, 55, 103]. The studies 'boosted' representation of ethnic minority groups by over-sampling in order to obtain adequate

numbers to enable meaningful analyses. Both first and second generation Irish people were included in the surveys [6, 55, 103].

The 2004 HSE suggested that, compared to the general population living in England, Irish men and women drank on slightly more days of the week[6]. A 'reverse' social class gradient was found in that people in the general population in higher income brackets were more likely to 'binge' drink[22]; this pattern was also replicated in the Irish group, with Irish men in the highest income bracket more likely to 'binge' drink that men in the general population, after standardisation by age [6]. A similar finding from the earlier 1999 HSE suggested that a larger proportion of Irish men and women reported drinking either >4 units (men) or >3 units (women) on their heaviest drinking day, compared to the general population [103]. Neither of the two main reports commented on alcohol use by generational status, although subsequent analyses have examined this using this data [55, 56]. These findings are discussed in the section on acculturation and health-related behaviours.

The 2004 HSE also ascertained reports of alcohol use in children, presumably most of these children would have been of second generation Irish descent [6]. Patterns of alcohol use in Irish children were similar to the general population, although there was a suggestion that Irish girls were more likely to report that they had tried alcohol compared to the previous HSE in 1999 and were also slightly more likely to report having tried alcohol when compared to the general population [6].

Tobacco use

Although controversial[112], smoking has been implicated in the elevated SMRs previously described amongst Irish people in this chapter, as it is a risk factor for cardiovascular and cancer mortality[19, 64, 65]. The controversy centres around the assertion that health-related behaviours such as smoking account for all observed health

[22] Binge alcohol use in this study defined as more than 8 units in one sitting for men, and more than 6 units in one sitting for women (Becker *et al* 2006).

inequalities in Irish people[19], over and above socioeconomic differences[112] . Most previous studies have reported elevated patterns of tobacco use in first generation or Irish-born migrants, relative to the population in the receiving country[19, 109]. For example, prevalence of smoking was found to be elevated in Irish-born males standardised for age and socioeconomic position in Great Britain, although this data related to 1978 and 1980[109]. Furthermore, standardised mortality ratios from lung cancer were elevated in Irish-born migrants, leading the authors to presume that tobacco use would have also been elevated in this population[19]. This finding has also been confirmed in Irish-born women[65]. A study of cancer in Irish people also confirmed elevated hazard ratios from lung cancer mortality, which persisted despite adjustments for housing tenure [57]. This study found that second generation Irish people had a higher hazard ratio for lung cancer mortality compared to Irish-born people, and that this risk was greater in people who had two Irish-born parents versus one[57].

Only a few other studies have included second or later generation Irish-descended people, in direct assessments of tobacco use. Using recent HSE data, tobacco use was not found to be elevated in second generation Irish people relative to the first generation[55]. Accounting for tobacco use and other health-related behaviours in models comparing the relative odds of reporting poorer self-rated health in second compared to first generation Irish people did not impact on overall odds ratios much in this study[55]. Finally, a study using data from the West of Scotland (which included third and later generation Irish descended people), suggested that older Irish-descended people[23] were more likely to smoke relative to the rest of the population[31]. Although tobacco use predicted poorer lung function (as assessed by FEV_1), it was not found to otherwise account for morbidity in this population[31].

[23] In this case Catholic religion was taken as a proxy indicator of Irish heritage

Mechanisms for health inequalities in Irish-born and descended people living in Britain: A discussion

The literature review suggests a wide range of indicators of health disadvantage experienced by Irish-born and descended people living in Britain. This section will consider some of reasons proposed by investigators to account for these health disparities. Despite a range of health-related morbidity and mortality indicators differentially affecting Irish people living in Britain, proposed mediators have tended to be similar across diverse health outcomes. As the focus of this study is on the potential for childhood disadvantage to accounting for excess adult morbidity, the focus of this section is primarily on literature relevant to this enquiry. There is an associated literature on the roles of identity [14, 23, 43, 44, 47], discrimination [93, 113, 114] and residential/ geographical context [42, 48, 115, 116] in accounting for the excess morbidity and mortality in Irish people, but these are not considered here, as it will not be possible to directly examine these factors in this study.

Selection and causation

A central theme which has emerged from the health disadvantage literature is the role of migration-related 'selection' in accounting for poorer health in Irish-born migrants versus the role of 'causation'- that is deleterious factors in the post-migration environment which may exacerbate or lead to subsequent health problems in Irish people. This section will critically examine both of these ideas. A caveat is that, as no study has ever examined pre-migration characteristics of Irish-born people prior to movement, the question of potential 'selection' versus changes to health as the result of migration ('causation') cannot be addressed directly.

Marmot and colleagues first noted that migrants from further afield experienced a 'healthy migrant' effect in having reduced SMRs relative to the non-migrant population in Britain, but speculated that as there were fewer barriers to migration from Ireland, Irish-born people experienced a relative 'stimulus' to migrate as a result of pre-existing health and social disadvantages [3]. Proponents of the selection hypothesis suggest that Irish-born migrants to Britain had selectively poorer health, relative to Irish people who remained in Ireland [3, 61, 74]. In the previous section, a study suggested that older

Irish-born migrants (potentially falling into the cohorts who emigrated from Ireland to Britain in the 1950s) were shorter in height and had poorer self-rated health than Irish people of the same age remaining in Ireland and English-born people in England, lending support to the thesis that pre-migration factors (such as childhood material deprivation[75]) may have been more prevalent in Irish-born migrants at this time [74].

In a more sophisticated elaboration of the 'selection' hypothesis, Ryan, Leavey and colleagues examined risk factors for depression in Irish-born migrants living in London [45, 79]. This study examined pre and post-migration context in accounting for depression in Irish-born migrants. In the quantitative arm of the study, a pre-migration history of depression in Irish-born men was a risk factor for depression, whereas a pre-migration history of childhood sexual abuse in Irish-born women was a risk factor [79]. The qualitative findings from the study lent support to the thesis that a large proportion of Irish-born migrants may have moved away from Ireland to escape difficult social and family circumstances, with some people already having pre-existing tendencies towards depression, prior to migration [45]. Although this study provides some support for the selection thesis, the study also explored factors relating to preparedness for migration and the post-migration context in accounting for depression in Irish-born migrants. Using an eight-question instrument to assess preparedness for migration, the authors found that for each negative answer, Irish-born migrants were 1.20 times more likely to be depressed than controls (95% CI: 1.06-1.36) [79]. The qualitative arm of this study correspondingly found that for some respondents, migration to Britain was a spontaneous and relatively unplanned event, promoted by geographical proximity, and a knowledge of acquaintances or family having previously migrated [45]. Other post-migration factors associated with depression were: poor social support, unemployment, alcohol misuse and lower levels of education [79]. In keeping with the latter study's finding, an analysis of Census data found that marital status played a large part in accounting for all-cause and cause-specific mortality in Irish-born and other migrant groups living in England and Wales [67]. In particular, both men and women who were

married (irrespective of country of birth- this study included people born in England and Wales, as well as other migrant groups[24]) had a much reduced SMR compared with people who were divorced, single or separated[67]. Accounting for marital status most significantly reduced SMRs from suicide and accidental causes in both Irish-born men and women in this study and also had an impact in reducing SMRs from lung cancer, cardiovascular disease and ischaemic heart disease in Irish-born women, and all of these causes except cardiovascular disease in Irish-born men[67]. This might suggest that a protective association of marital status for some of these causes of death in Irish-born people living in Britain[67], further implicating the role of social support for health.

Studies reviewing the use of alcohol have also explored the notion that stress and adversity in the post-migration setting may exacerbate or promote alcohol misuse in Irish-born people (cited in [96]). For example, a noteworthy qualitative analysis by Tilki suggested an important role for the public house amongst Irish-born men working in the building trades in providing a hub for employment, entertainment, social networks, accommodation, and at times even a place to cash wage-cheques [95]. The alternative for many Irish-born men working in the trades in the 1950s-1970s would have been harsh and often lonely, for example, having to take accommodation in boarding houses where no visitors were allowed [95]. Although they would have provided a refuge, public houses would have also exacerbated problems with alcohol misuse; social pressures to drink at hazardous or harmful levels would have been further exacerbated by publicans and contractors often offering credit [95].

Another study examined people on an Ireland-England ferry and compared this sample to Irish-born people living in hostels (cited in [96]). In this study, there was an Irish-born group living in stable accommodation, similar to the receiving country population. In the second group, individuals were more likely to be itinerant and living in transient accommodation, and had alcohol problems in the context of concurrent social problems.

[24] Other migrant groups surveyed in this study included people born in the Caribbean, Indian subcontinent and in Scotland (Maxwell & Harding, 1998).

The authors of this study suggest that factors relating to the post-migration context exacerbated alcohol problems in Irish-born people (ibid).

Further evidence for the post-migration settlement context playing an important role in the health of Irish (and other ethnic minority groups) comes from recent work examining associations of residential own-group density with health [48, 115, 116][25]. These studies found that Irish people (including first and second generation Irish) were less likely to screen positive for common mental disorders[116], or report suicidal ideation or longstanding limiting illness[115] in areas of higher own-group density. A similar trend was noted for psychotic experiences, although findings were not as strong[48]. These studies suggest that there may be area-level benefits to mental and physical health when living in areas of higher own-group density, despite these areas frequently being more likely to be deprived, amongst Irish people living in Britain and would lend further support to the notion that factors in the post-settlement environment may be important in accounting for mental and physical health differences in Irish and other migrant/ ethnic minority groups[117].

In a further exploration of mechanisms which might have accounted for 'ethnic density' associations in these studies[117], the authors found that Irish people living in areas of lower own group density were more likely to report chronic strains, problems with relatives and problems with finances[48], suggesting associations with the environment (and density) and traditional risk factors for mental health[26], although these did not directly mediate or moderate mental health associations in this group. There was some evidence that poorer social support and experiences of racism and discrimination

[25] I designed these studies separately to the work presented in this thesis however the findings are informative (Das-Munshi, J., et al., *Understanding the effect of ethnic density on mental health: multi-level investigation of survey data from England.* BMJ, 2010. **341**: p. c5367; Das-Munshi, J., et al., *Ethnic density as a buffer for psychotic experiences: findings from a national survey (EMPIRIC).* The British Journal of Psychiatry, 2012. **201**(4): p. 282-290; Becares, L. and J. Das-Munshi, *Ethnic density, health care seeking behaviour and expected discrimination from health services among ethnic minority people in England.* Health & Place, 2013. **22**(0): p. 48-55.).

[26] Although a criticism of this work is potential reverse-causality, as the data was cross-sectional

(both implicated in the aetiology of common mental disorders) were less likely in ethnic minority groups living in areas of higher own-group density, although this latter finding was also less consistently observed in the Irish group [116]. Differences between first and second generation Irish people were assessed in these studies using tests for interaction, however no differences were found[48, 116], likely due to low power.

Therefore previous work suggests a potentially complex interplay of selection (related to the pre-migration context) and causation (mostly related to the post-migration context) in accounting for the health of Irish-born people. In the next section I will consider the role of 'acculturation' in potentially patterning behaviours and health outcomes in Irish-born and second generation Irish people.

Acculturation and health-related behaviours

Commentators have suggested that health-related behaviours such as alcohol use, smoking and diet might account for the differential mortality and morbidity findings affecting Irish people [19, 61, 64, 109]. This section will attempt to critically evaluate this notion using evidence from studies which have assessed this directly. A related concept is that of "acculturation" defined as "behavioural shifts due to the cumulative exposure to the host population following migration" [56]. The concept of acculturation has controversial origins, in that it was first equated with notions of 'assimilation', which postulated that migrants would leave their own culture and cultural characteristics behind, and instead adopt the culture of the receiving country [118]. This simplistic (and unidirectional) view was later challenged by research (cited in ([118]). As the concept of acculturation has not been fully abandoned, and because it may provide some understanding of health-related behaviours and potentially their 'transmission' (if indeed this occurs) across generations, the literature relating to acculturation and health-related behaviours in Irish-born and descended people will be briefly considered here. In addition, in a previous section of this chapter the high levels of upward social mobility previously noted in second generation Irish people was also discussed. Some commentators have suggested that upward social mobility may accompany the potential processes also underlying acculturation [55, 56], and as

mobility across the life-course will be examined in this study, it would also make sense then to consider the potential role of acculturation.

It should be noted that 'acculturation' can refer to the adoption of both positive and negative health-related behaviours [118], for example one study suggesting the effect of negative acculturation in leading to the loss of maternal health protective behaviours (e.g. related to smoking and breastfeeding behaviours in the antenatal and postnatal periods), over subsequent generations of ethnic minority women living in Britain [119].

Several studies have considered changes in alcohol use and other health-related behaviours amongst Irish-born or descended people as a result of 'exposure' to Britain [55, 56, 102]. If acculturative processes were to account for changes to health-related behaviours in Irish people living in Britain, then one would expect Irish-born people settled in Britain for longer (as well as later generations of Irish-descended people) to acquire behaviours more similar to that of the White British / receiving country population [56]. In a crude examination of this, a study assessed first admissions to adult psychiatric in-patient units for alcohol-related problems, amongst Irish-born migrants living in England, compared to the rates in Irish-born people remaining in Ireland and English-born people in England [97]. This study showed that first admissions for Irish-born people living in England were midway between admission rates in Ireland (which were high) and admissions for English-born people in England (which were low) [97]. Although the inference of this study might be that migration to England from Ireland had conferred 'health advantages' in reducing rates of psychiatric admissions due to alcohol-related problems, (potentially through acculturative processes), the authors of this study rightly caution that service-related differences in Ireland compared with England potentially drove most of the differences in the findings[97].

Further support for the acculturation theory comes from studies that have examined intergenerational differences in health-related behaviours in Irish-descended people [55, 56, 106, 107]. In an assessment of fourth generation Irish descended people living in the West of Scotland, there were very few differences between non-Irish Scottish people

and Irish-descended people in their alcohol intake, although with some differences by religious affiliation [106]. There were no differences in tobacco use [106]. Irish-descended people reporting 'no religious beliefs' drank at higher levels than Irish-descended people, and Irish-descended men and women who were Catholic drank more than Protestants [106]. The qualitative findings of this study led the author to suggest subtle differences in health-related behaviours that might be accounted for through religious values, although in general by the fourth generation, Irish-descended people living in Scotland had behaviours fairly similar to those of the receiving country[27] [106]. These findings were replicated in another study, also set in the West of Scotland, which did not find any differences between Irish-descended people and non-Irish people on any health-related behaviour indicator (which included: participation in sport, alcohol intake, quantity of cigarettes smoked, and age of starting smoking) [41]. Only 'current smoker' status was more prevalent in older Irish-descended people (aged 58) relative to non-Irish respondents [41].

In a study using general household survey data from Britain, second generation Irish people were no more likely to drink alcohol compared to non-Irish people [107]. The authors noted that among Irish-descended people who did drink, amounts consumed were more likely to be above recommended limits when compared to non-Irish people, this was especially the case for second generation Irish men who had one parent born in the Republic of Ireland and one British-born parent, or in second generation Irish women born in Northern Ireland [107].

Two further studies have examined intergenerational differences in health-related behaviours using data from the Health Survey for England [55, 56]. In all of the ethnic

[27] Although for alcohol- this might be an area of concern as alcohol-related mortality in Scottish-born people in England is grossly elevated relative to the English-born, and fairly similar to SMRs for Irish-born people in England (Bhala et al 2009). Conversely the SMRs of Irish-born people living in Scotland for alcohol-related mortality is either equivalent to, or less than, that of the Scottish-born in Scotland (Bhala et al 2010). It may be that Irish-descended people living in Scotland have 'acquired' health-damaging behaviours equivalent to the possibly higher background rates in Scotland.

minority groups surveyed[28], including the Irish group, second generation ethnic minority groups were more likely to report drinking alcohol (relative to not drinking at all) compared to first generation migrants, although the magnitude in the differences between first and second generation Irish people were not as marked as for the other ethnic minority groups [55]. Irish-born people in the sample were more likely to report abstinence [55], and in subsequent analyses of the same dataset the authors noted that Irish-born people were 0.69 times less likely (95% CI: 0.56-0.85) to report drinking alcohol in the previous week relative to White British respondents [56]. Second generation Irish people had an odds ratio similar to the White British reference on this question (OR: 1.01 (95% CI: 0.87-1.18)) [56]. The authors also noted that on a number of important health-related behaviours, including smoking, 'eating fried foods', and drinking alcohol, there was evidence that the prevalence of behaviours in second generation Irish people was closer to that of the receiving country majority population (White British) and less like that of the Irish-born migrant sample [56].

In a direct assessment of alcohol-related behaviours and acculturation, McCambridge and colleagues assessed two convenience samples of Irish-born pub-goers in Dublin and in London [102]. Irish-born pub-goers in London reported higher mean quantities of alcohol drunk in the week prior to interview, and more mean days of alcohol use in the month prior to interview [102]. In multivariate analysis the London site was more likely to have hazardous drinkers according to the AUDIT [102]. On the basis of their findings, the authors suggest… "in the London sample, it appears that the Irish have acquired the English pattern of frequency of drinking, whilst retaining the Irish pattern of quantity of consumption" [102].

So do health-related behaviours account for morbidity and mortality differences as previously reported in Irish-born and descended people? Studies in which authors have

[28] See Table 1- this included people who were of: Black Caribbean, Indian, Pakistani, Chinese, and Bangladeshi ethnicity

made these assertions have, in the main, not examined this directly [19, 61, 64]. In the final section I will review those studies in which this has been assessed directly.

In an analysis of Health Survey for England data [55], the authors directly assessed the contribution of health-related behaviours (smoking, diet, vegetable consumption and alcohol intake) in accounting for differences in reports of poorer self-rated health in second generation versus first generation Irish people and found that adjusting for health-related behaviours in regression models made little difference to estimates[55]. Similarly, in an assessment of all-cause and cardiovascular mortality, investigators found that cigarette smoking accounted for only a small proportion of the excess mortality risk in Irish-descended people, with relative deprivation across the life-course providing a more parsimonious explanation[29][11]. In this study, the investigators found that even after accounting for all traditional risk factors for mortality, alongside numerous disadvantage measures, much of the excess mortality risk in Irish-descended men remained unaccounted for[11]. In a companion analysis of the same dataset, the authors reported that smoking accounted for little, if any, of morbidity differences noted in their Irish-descended sample; morbidity outcomes assessed included: poor self-assessed health, depression either in the previous year or as according to the Hospital Anxiety Depression rating scale, and self-assessed disability [41]. Smoking in this analysis did however explain poorer FEV_1 in Irish versus non-Irish respondents [41].

In summary, work to date appears to support the notion that 'selective migration' as well as stressors related to the post-migration context may have predisposed Irish-born people to poorer health. For second and later generation Irish people there is a suggestion that health-related behaviours have started to converge with those of the receiving country population. The failure to account for persistent health inequalities through standard indicators of socioeconomic disadvantage, may have led some

[29] Life-course disadvantage was assessed in this study through: (Childhood disadvantage)- father's social class, cumulative social class, number of siblings, age of leaving full-time education; (Adult disadvantage): Car driving, area-level deprivation and social class at time of survey (Abbotts et al, 1999)

researchers to assume, tacitly, that health damaging behaviours must therefore account for any remaining morbidity/ mortality differences in Irish people[112]. In the few studies to have directly assessed this notion, the contribution of health-related behaviours in accounting for morbidity and mortality differentials in Irish people appears to be negligible.

Childhood adversity

Within the field of life-course epidemiology, the contribution of childhood circumstances and adversity to later adult health outcomes is well established [34, 88, 120-122]. This literature will be considered in more depth in Chapter 3. Despite this burgeoning literature, few studies of minority and ethnic health inequalities have drawn upon these life-course insights. The handful of studies examining childhood circumstances in accounting for adult health in Irish people will be reviewed in this section.

Where pre-migration factors have been considered [45, 74, 95], the role of industrial and reformatory schools in Ireland have been a frequent theme[30]. These schools were harsh and punitive settings, frequently recalled in the accounts of Irish-born people with mental health problems, many years later, in qualitative studies [45, 95]. In an enquiry into the abuses committed at these schools, the Ryan Commission estimated that up to a half of children at these schools subsequently emigrated away from Ireland (cited in [74]). This would tie in with emergent themes from Leavey et al's qualitative synthesis of Irish-born migrants with depression in London, where the authors describe a sub-group of people as 'escapers', in whom traumatic childhood experiences acted as important 'push' factors in their decisions to emigrate [45]. In another study by Tilki, a related theme which emerged from interviews, was in the use of alcohol to deal with abuses experienced in childhood, amongst some Irish-born informants [95].

[30] In 1999 the Irish government issued an apology to child abuse victims, and a Commission was set up to enquire into the role of industrial and reformatory schools in perpetuating sexual and physical abuse against children resident in these school. Many of the school were managed by religious orders. See http://www.childabusecommission.ie/rpt/index.php

In previous research, height has been used as a proxy for adverse childhood socioeconomic circumstances [75]. As described in the section on self-rated health, a recent study found that Irish-born migrants who would have emigrated to Britain around the 1950s had a much lower mean height compared to people of the same age remaining in Ireland, as well as compared to English-born people in England, lending some support to selection theories of migration from Ireland [74]. However, it would seem that childhood socioeconomic disadvantage was not just specific to Irish-born migrants arriving in Britain in the post-war period, as an analysis of fourth generation Irish-descended people living in the West of Scotland suggested that Irish-descended people were shorter than non-Irish Scotsmen, although height differences disappeared after taking into account measures for socioeconomic position in the younger age groups [31]. The implication of the latter study is that socioeconomic disadvantage has potentially persisted among Irish-descended people living in the West of Scotland almost 150 years later, crossing several generations of Irish-descended people [31, 123]. The latter finding may only relate to the regional context of Irish migration (which as elaborated in the previous sections, followed strong period and geographical trends), as a more recent study using data from the Health Survey for England found that in general, mean heights in Irish people (this sample included first and second generation Irish people) were roughly equivalent to that of the general population, although Irish women in the younger age groups of 35-44 were still noted to be shorter than the general population [124].

Are there similarities with the experiences of other migrant and second generation groups in Europe?

Whilst it would be outside the scope of this Study to consider all other studies examining health in second generation ethnic minority groups in other countries, similarities to certain other contexts do suggest themselves and so these will be briefly mentioned here.

Several authors have noted similarities of Irish migration to Britain to that of migrants to Sweden and other Scandinavian regions, where movement from neighbouring countries is also relatively informal and entry criteria fairly relaxed, [23, 44, 125].

Similar to the case of Irish-born migrants, negative selection effects may account for at least some of the health disadvantages previously noted in these groups. For example, elevated mortality has been noted in migrants from neighbouring Nordic countries to Sweden [125], and mortality from suicide is elevated in Sweden in migrants from the neighbouring countries of Finland, Russia, Germany, Denmark and Norway [27]. In addition, elevated rates of psychosis have been noted in Denmark, also among migrants who were born in neighbouring countries [29].

As with the literature for health disadvantages in Irish people living in Britain, health inequalities have continued to be observed in second generation ethnic minority groups in these regions. Risk of suicide remains elevated in second generation ethnic minority groups living in Sweden, especially in those of second generation Finnish, or Western and Eastern European descent [24], and high rates of psychiatric hospitalisation have been observed in second generation Finns in Sweden [28], as well as elevated rates of admission for alcohol-related diagnoses [25]. Although previous authors have examined the role of adversity in accounting for elevated rates of psychosis in second generation ethnic minority groups in Sweden [26], literature critically examining causes for the continuity of health disadvantage in second generation groups in these and other countries remains scant[1].

Conclusion to Chapter Two: The Irish as a 'case study'

Within the broader literature, the distinction between a (mainly sociologically informed) literature on the social construction of 'ethnicity' in health research and that of (a more geographically and economically informed) literature on migration remain conspicuously distinct [32]. However, in most instances, migrant groups 'become' an ethnic minority group, as a result of geographical relocation [1, 32], and so the lack of overlap in literature is somewhat surprising.

People who have a history of movement and settlement into new environmental and social situations often experience differing rates and risks for illness[3, 126]; understanding this may help to elucidate wider aetiological causes and may also provide clues as to structural processes in patterning adverse health outcomes. The earliest studies to use this approach examined the impact of acculturation on hypertension in Japanese migrants to America; demonstrating important variations in disease prevalence relevant to Japanese people in America, with mechanisms related to the social environment, hence advancing understandings of the aetiology of hypertension [127]. Research into health differences in second generation ethnic minority groups, and the factors across the life-course-potentially linking to parental migration histories, may provide some indication of factors that might account for the intergenerational 'transmission' of health inequalities[55], yet such research (despite a few notable exceptions [9, 55, 57]) remains conspicuously absent [1]. In Chapter 4, I will discuss potential mechanisms for the intergenerational transfer of health inequalities from the first to the second generation further, and the ways in which I plan to explore these mechanisms within the datasets.

Clearly, as the first part of this chapter suggested, the Irish in Britain have a distinct history of migration and settlement in Britain, yet there may also be structural factors not just specific to 'being Irish in Britain' [13], which may shed light on understanding health inequalities in other second generation ethnic minority groups, both in Britain and in other countries [128]. In this Study I aim to understand the health of second generation Irish people growing up in Britain. Understanding the factors accounting for the generally poorer health in Irish people may also have a broader relevance to other

migrant groups who arrived in Britain during the long boom years, and who also potentially migrated into disadvantaged circumstances. The findings may also generate hypotheses for study in other European settings where migration has become increasingly informal, and where the growth in the population of ethnic minority groups is not just through new in-migration, but also through migrants settling permanently, and forming families [32].

3 Chapter 3: Life course epidemiology: Overview

Introduction

The previous chapter focused on the literature around health inequalities experienced by Irish people living in Britain, and the potential reasons which have been put forward for this. A notable absence in this literature has been a perspective informed by the paradigm of life-course epidemiology. In this chapter I will aim to provide an overview of life-course approaches to understanding chronic disease morbidity and health inequalities.

In the first part of this chapter I will provide an overview of life course epidemiological theory. Although this thesis will not directly analyse cardiovascular disease as a health outcome, an overview of this literature is relevant and will be introduced briefly here. This is because most of the earliest life-course work was based on cardiovascular disease and subsequently, many of the underlying disease mechanisms proposed for cardiovascular disease show commonalities across some of the health outcomes which will be examined in this thesis. In addition, the literature on cardiovascular health is also relevant to self-rated health, which will be examined as an outcome in its own right, in this study. Furthermore, health-related behaviours such as alcohol and tobacco use which will be examined in this thesis are also associated with cardiovascular disease.

In the second part of this chapter I will present key findings from within the field which are specific to the downstream health outcomes under investigation in this study; these are: common mental disorders, self-rated health[31] and alcohol and tobacco use in adulthood. The literature is vast and so for the purposes of the present chapter only the most salient studies and relevant findings from systematic reviews will be presented.

[31] Whilst I could not directly assess mortality in this study, I will present literature relating to this outcome as well as self-rated health is a predictor for mortality (DeSalvo et al, 2006).

In Chapter 5, I will synthesis the themes presented in this chapter with the potential reasons underlying persistent health disadvantages experienced by Irish people living in Britain. As highlighted in the previous chapter, there have been very few studies that have managed to bring an understanding of health inequalities **over the life course** to studies on ethnic minority health disadvantage[1], or more specifically in Irish people. The literature reviews presented in this chapter, together with the discussion presented in Chapter 5, leading to the analyses and results which I will present in Chapters 7-10, will directly address this gap in the literature.

Historical overview

Although life course epidemiology has become fashionable over the last three decades, the ideas underpinning this field date back to the first half of the twentieth century[129, 130]. Concerns with the potential impact of childhood social conditions on later adult health and mortality were already *en vogue* at the turn of the nineteenth century, with the observed dramatic decline in all-cause mortality noted in both children and adults, as well as improvements in observed mortality across generations, which was attributed to improvements in early life conditions [129]. From the 1950s onwards, interest was renewed in the potential role of early life factors in patterning chronic disease morbidity in adults; corresponding with the establishment of several UK birth cohorts, specifically the 1946 and 1958 Birth Cohorts[32] [129, 131].

Overview of life-course epidemiological theory

In their glossary to life course epidemiology, Kuh and colleagues set out a brief description of the main theoretical elements which comprise this growing field [132]. They suggest that life course epidemiology consists of a number of constructs which span

[32] It should be noted that the birth cohorts were not initially set up for the purposes of examining adult health/ life course epidemiology. The 1946 British Birth cohort was devised to understand mother and child health, costs of having children and provision of speciality care in Britain. The 1958 British Birth Cohort was set up to understand the reasons behind perinatal mortality and morbidity, and antenatal care. Over time, additional funding has been found which has enabled these cohorts to become valuable resources for life-course epidemiological enquiry (*Wadsworth, Ferri & Bynner, 2003*).

biology, sociology and psychology and is not a field simply differentiated through longitudinal study design [132]. In a later editorial, Ben-Shlomo and Kuh define the enterprise of life course epidemiology as "*the study of long-term effects on chronic disease risk of physical and social exposures during gestation, childhood, adolescence, young adulthood and later adult life. It includes studies of the biological, behavioural and psychosocial pathways that operate across an individual's life course, as well as across generations, to influence the development of chronic disease*" [33].

Conceptually, the field comprises a body of work proposing inter-related aetiological mechanisms accounting for downstream adult health outcomes. A brief summary is presented here. Although each section summarises mechanisms as being exclusive from each other, most commentators acknowledge that mechanisms are inter-related and overlap [33, 133].

Foetal origins hypothesis

Forsdahl first suggested that high rates of cardiovascular disease in regions of higher infant mortality suggested that deprivation in childhood followed by later affluence might predispose individuals to an increased risk of cardiovascular disease[134]. Using observations from ecological studies, Barker and colleagues built on this hypothesis and observed a link between early life conditions and adult health[135]. The authors noted that geographical areas with high adult mortality from ischaemic heart disease also experienced higher infant mortality 50 years previously[135]. This led the authors to propose that adult rates of chronic disease might be associated with antenatal nutritional factors, and specifically, birth weight [135]. These early studies were criticised on the grounds that the findings could also be accounted for through the persistence of disadvantage within geographical areas [136, 137]. Later work by the same group also examined data derived from historical birth cohorts [138, 139]. These findings supported the view that low birth weight[33][138, 139] and low weight at one year [138], as well as

[33] Particularly if birth weight was discordant with placental weight (ie. low birth weight babies with larger placental weights) (*Barker, Bull, Osmond, Simmonds, 1990*)

breast feeding practises [138], and low ponderal index, or thinness at birth (cited in [140]), were associated with later cardiovascular disease outcomes[138] and adult hypertension[139]. Barker went on to suggest that these associations might be accounted for through 'foetal' or 'biological programming', such that environmental insults occurring during a 'critical period' of foetal development, set in chain a series of biological events which would lead people to have an increased risk of developing ischaemic heart disease many years later [139, 140].

Challenges to the 'Foetal Origins' Hypothesis

More recently, migrant studies have been used to examine some of the assertions of the Foetal Origins Hypothesis [30, 141-143]. As migrants may move from 'low risk' to 'high risk' areas, these studies have been regarded as 'natural experiments' that allow an analysis of varying exposures at different time points over the life-course [30]. These studies also allow the possibility of assessing directly Forsdahl's hypothesis that the movement from childhood poverty into later affluence may further increase cardiovascular risk, as typically have examined people moving from less affluent (e.g. from low or middle income countries) to more affluent settings [30, 142].

Migrant studies from various international contexts were surveyed in a systematic review, which included cross-sectional as well as longitudinal study designs [30][34]. The authors found that in general, children or adults who had migrated had a greater risk of hypertension than comparison groups who had remained behind [30], and that this increased risk appeared to be related to duration of exposure to the new environment, with findings broadly consistent across both longitudinal and cross-sectional study designs [30]. Of note however, changes to blood pressure in people who migrated although elevated relative to comparison groups who had stayed behind, were not elevated more than people in the place where they had migrated to[30]. The authors suggested that factors relating to the post-migration context such as dietary change (e.g.

[34] Reviewed studies included studies of migrants from Tokelau to New Zealand, Chinese rural to urban migrants, Ethiopian migrants to Israel and rural-urban migration in Kenya (*Elford & Ben-Shlomo, 2004*).

salt, fat and cholesterol intake) associated with settlement in urban locations might have accounted for findings, but that as changes to blood pressure in the migrant group became equivalent to those in the migrants' destination, little evidence for Forsdahl's hypothesis could be found [30].

Despite Barker's proposal that the Foetal Origins hypothesis has a biological mechanism at its basis [140], many investigators within the field have continued to place primacy on the social determinants of health [144]. For example, Blane suggests that as parental social class is associated with birth weight, and because adult height is associated with childhood, adolescent as well as later adult socioeconomic conditions, "…*a person's past social experiences become written into the physiology and pathology of their body. The social is, literally, embodied*…" [144].

The latter point is supported through empirical evidence from the 1958 Birth Cohort, in which children with low birth weight were more likely to grow up under circumstances of childhood deprivation, compared with children of normal birth weight [145, 146]. These findings might suggest methodological difficulties in establishing the extent to which 'biological programming' models (where low birth weight is the primary exposure) are affected by the residual confounding effects of associated social disadvantage, given the large literature which has also suggested strong associations between childhood deprivation and adult health outcomes [34, 147]. However, as other commentators have suggested, the specificity of low birth weight in predicting hypertension, impaired glucose tolerance and coronary heart disease suggests that the residual confounding effects of socioeconomic position do not fully account for observed associations; if this were the case one would find associations between low birth weight and lung cancer as well (which also has strong associations with socioeconomic position), however this has not been observed [133]. In addition, Barker's findings have been replicated in other birth cohorts which were able to adjust for indicators of socioeconomic position; in these instances the inverse association between birth weight and adult cardiovascular disease persisted (cited in [133]).

Taken together, these studies suggest a complex picture in which pre-natal, childhood, as well as later adulthood factors, all potentially play a role in the pathogenesis of adult cardiovascular disease, hypertension and impaired glucose tolerance. The mechanisms may not be exclusively through biological/ foetal programming, and may also be subject to later effect modification by environmental factors, and/ or other mechanisms[133]. In addition, biological risk factors implicated in the Foetal Origins Hypothesis, such as low birth weight, may be strongly socially determined.

Sensitive periods and social origins of health inequalities

The Foetal Origins hypothesis is frequently referred to as a 'critical period' model as it implies a strict time-frame during which specific exposures may lead to adverse health outcomes many years later[33]. Ben-Shlomo and Kuh highlight that this differs from a notion of 'sensitive periods', whereby adverse exposures may also lead to poorer health outcomes, but that the time-frame for this is less restricted. Outside of the main time window, harmful exposures may still impact on later health outcomes, although associations may be weaker [33]. In addition, there is greater possibility to modify or reverse harmful exposures occurring during sensitive periods of development [132].

As a variation of a sensitive periods model, some commentators have discussed a 'social origins' model, whereby health inequalities established in childhood impact on later adult health and social outcomes, potentially independently of adult socioeconomic position [34, 35, 147, 148]. Much of the social origins literature emphasises the potential for intervention during early periods of development, to reduce the risk of later adverse adult health outcomes [34, 35, 146, 148]. An attraction of this approach is that interventions to reduce childhood disadvantage may have global benefits for a variety of health outcomes [148], as the effects of childhood disadvantage appear to be relatively non-specific and potentially impact on a number of downstream adult health outcomes and health-related behaviours [148].

The accumulation of risk hypothesis

Whereas Barker and Forsdahl's work might be seen as belonging to theory classed as 'latent' or 'biological' effects, in that factors early in life set into motion a biological

cascade of events which have implications for later adult health [132], others have suggested that adverse environmental/ social exposures over the life-course may add together in a cumulative fashion, increasing an individual's risk of later disease [144].

It has also been suggested that social adversities as well as risk factors for disease tend to 'cluster' together in individuals. Exposure to one type of disadvantage may cluster with other forms of disadvantage, with such clustering observed both cross-sectionally and longitudinally [130, 133, 144]. This is supported, for example, by one study in which the authors examined data from the 1958 British Birth Cohort and found that social class at birth predicted a wide variety of later social outcomes, ranging from access to basic household amenities, household overcrowding, low income, divorce or separation of parents or cohort members and social support in early adulthood [146]. Similarly, the clustering of risk factors relating to insulin-resistance has been noted to occur in childhood, with this risk continuing longitudinally into adulthood (cited in [130]).

Methodologically, investigators have tended to assess the accumulation of risk by summing together measures for social adversity or disadvantage over the life course, and assessing the association of such exposures with the risk of adverse health outcomes in adulthood[149]. For example, in a study from Scotland not only was there a 'dose-response' association between the number of times participants were in a manual social class position with disease risk factors (ranging from blood pressure, cholesterol, BMI to height), but a similar association was also noted between number of times individuals were 'exposed' to a manual social class position and later mortality risk [150]. Lynch and colleagues examined income in an American cohort, and also found a similar 'dose-response' association between the number of times individuals were exposed to economic hardship and a range of health outcomes, which included disability, depression, and mortality [151].

Pathway models of risk

Authors who have employed this concept have tended to conceptualise disadvantage as sharing a degree of continuity over the life course, such that earlier experiences of disadvantage may predispose individuals to later disadvantage, with implications for adult

health. Pathway models overlap with accumulation models of risk, to the extent that both model the clustering of multiple social adversities over the life course in individuals [34]. This has also been termed as 'chains of disadvantage' (Blane , cited in [149]) or 'life trajectories' of disadvantage (Hertzman, cited in [149]). Within the field of mental health, this conceptual pathway has much intuitive appeal, given a large literature supporting the view that experiences of maladaptive parenting and childhood adversity may predispose individuals to form maladaptive relationships leading to poorer social support and adverse mental health in later life.

Social mobility and the life-course

Social mobility across the life-course has also been considered extensively in its associations with adult health outcomes [149, 152]. Much of this research tradition derives from a consideration of why health-related social class gradients persist [153]. Ever since the Black Report [154], investigators have either sought to show that social class gradients in health are either due to 'selection effects'; that is, 'healthier' people have greater upward mobility, whereas people with poorer health are more likely to be downwardly mobile[155], or that 'causation' accounts for social class gradients in health- that is, poorer health is a function of social disadvantage [153, 154].

Social mobility has been variously defined in the literature [156]. In its simplest conceptualisation it reflects changes in socioeconomic position across two time points either within the same generation ("*intragenerational* social mobility") or between generations ("*intergenerational* social mobility")[36][35]. Where investigators have considered social mobility within cohort data, the focus has tended to be on intergenerational social mobility and the associations that this has with later adult health [149].

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[35] See the systematic review, "Das-Munshi, J., G. Leavey, S.A. Stansfeld, and M.J. Prince, Migration, social mobility and common mental disorders: critical review of the literature and meta-analysis. *Ethnicity & Health*, 2012. **17**(1-2): p. 17-53" in *Appendix B.* This review was compiled as part of the work for this PhD.

In earlier work using cohort data, investigators examined the role of social mobility in leading to socioeconomic gradients in health outcomes in adulthood. Most of this work supported the view that intergenerational social mobility acted to 'constrain' social class gradients in health, in that people who are mobile have a risk of health outcomes which is mid-way between those in the class they left behind and those in the class which they join[144, 152, 157]. In more recent work, investigators have attempted to examine the role which social mobility may play in determining later health outcomes, relative to accumulation or critical and sensitive period models[35, 158, 159]. Disentangling competing models of life-course risk has been described as being methodologically challenging[158]. I have discussed this issue further, below.

The application of social mobility processes in understanding how health inequalities may result in migrant and ethnic minority groups has been little studied. This is a obvious gap in the literature as it is also well known that migrants tend to pay an 'occupational penalty' (or become downwardly mobile) in migrating internationally[36]. Therefore it is possible that the processes of migration and social mobility may interact in patterning health outcomes. Authors of two studies considered intergenerational social mobility amongst migrant groups in Britain [55, 160]. In the first study, the authors found that in downwardly mobile West Indian or South Asian migrants, the relative odds of Limiting Longstanding Illness (LLTI) was greater than for the rest of the sample who were downwardly mobile. Similar to previous work examining social mobility in non-migrant populations [144], the authors of this analysis found that the net effect of social mobility was to constrain social class gradients in LLTI in the non-migrant/ reference sample, however this was not seen for downwardly-mobile South Asian and West Indian migrants in this study[160]. Instead, downwardly-mobile South Asian and West Indian migrants reported more LLTI than the non-migrant/ reference sample [160]. This finding led the authors to speculate that downward mobility may have an even greater negative impact on the health of migrants due to a lack of economic or social resources in the receiving country and may play a role in accounting for inequalities in the reporting of LLTI between the least and most disadvantaged people, in these migrant groups [160].

In a second study of first and second generation ethnic minorities in England, the authors found that although second generation ethnic minorities were in general more likely to be upwardly socially mobile than the first generation, accounting for socioeconomic position in models led to a larger risk of reporting 'fair' or 'poor' general health, in the second generation relative to the first, across some of the groups[55]. This latter study included first and second generation Irish people, in whom the odds of reporting fair/ poor health appeared to be similar to the reference population in fully adjusted models[55].

Therefore, although literature relating to the life-course in migrant and ethnic minority groups is lacking, it would seem that social mobility and migration may interact in unique ways, in accounting for health inequalities. In the next chapter I will specifically examine the impact of social mobility over the life-course upon common mental disorders in migrants and second generation ethnic minority groups, in order to address this gap in the literature as well as inform the analyses presented in the later chapters, on second generation Irish people.

Models of the life-course as applied to health-related outcomes in this study

Common mental disorders

For depression and the other common mental disorders, the idea that childhood may be crucial in the aetiology of later life mental and emotional health is firmly established, going back to the psychodynamic theories of Freud [161, 162]. In the following section I will summarise some of the main themes which have underpinned research examining life-course antecedents of common mental disorders.

Continuity of childhood psychopathology with adult psychopathology

It has long been accepted that adult common mental disorders show continuity with psychopathology in childhood [163, 164]. This has been termed either 'heterotypic' or 'homotypic' continuity [163]. Whereas 'homotypic' continuity refers to childhood disorders continuing into adulthood in a similar form, 'heterotypic' continuity refers to emotional or behavioural disorders in childhood predisposing to seemingly disparate adult mental disorders for example, conduct and oppositional disorders in childhood predicting later depression, schizophrenia, eating disorders and mania in adulthood (cited in [163]). In recent research using data from the NCDS, the authors found evidence to support both homotypic continuity (childhood emotional disorders predicted adult common mental disorders) and heterotypic continuity (childhood externalising disorders predicted later mid-life common mental disorders) in the cohort [88].

Socioeconomic position over the life-course and common mental disorders

While it is well established that lower socioeconomic position in adulthood is associated with an increased risk of depression [165] or common mental disorders [166], the literature around the *life-course* risk of depression in people experiencing a more disadvantaged socioeconomic position is more complex, partly as a result of the challenges of disentangling the contribution of other related variables. Table 3-1 summarises several key studies in which cohort data was used to examined life-course socioeconomic position and adult common mental disorders.

Table 3-1: Life course associations of common mental disorders, selected studies

Study, author, *N*, gender	Measures for CMD, SEP, confounders	Childhood SEP associations with adult CMD	Adulthood SEP associations with adult CMD	Conclusions
NCDS: Stansfeld *et al* , 2010. [168]; 7, 11, 23,33, 42, 44/ 45; N=9377	**CMD:** Malaise Inventory at age 23, 33, 42. CIS-R at mid-life where Depression, GAD, phobias & panic assessed. **SEP:** Social class in childhood (parental) and adulthood. Tenure in childhood and in adulthood. **Confounders:** Gender, childhood SEP, adult SEP, childhood internalising & externalising disorders	1. People reporting 2+ times manual vs. 'never manual' in childhood had OR:1.28 (95% CI: 1.00, 1.62) for mid-life CMD (adj for gender, adult SEP). Diminished to OR: 1.18 (95% CI: 0.92-1.51), after adjustment for childhood psychological disorders. 2. Dose-response association between 'no. of times had childhood disorder' & mid-life CMD. Persisted after adjustment for childhood & adult SEP. 3. Dose-response association between cumulative	People reporting 'two or more times' versus 'never manual' social class in adulthood had an OR of 1.55 (1.23,1.96) (adj for gender and childhood SEP) which diminished after adj. for childhood psychological disorder to OR: 1.27 (95% CI: 1.14-1.80) .	1. Association of childhood SEP and tenure with mid-life CMD is mediated by childhood psychological disorders. 2. Cumulative childhood psychological problems were associated with adult SEP (tenure & class) even after adjustment for childhood SEP, suggesting 'selection' effects. 3. Childhood psychological health exerted strong distal associations with mid-life common mental disorders which persisted after adjustment for childhood

Study, author, *N*, gender	Measures for CMD, SEP, confounders	Childhood SEP associations with adult CMD	Adulthood SEP associations with adult CMD	Conclusions
		childhood psychological health and adult SEP persisted after adjustment for childhood SEP, & psychological disorder at 42		and adult SEP
Dunedin, New Zealand Poulton *et al* 2002 [35]; Age: 0,3,5,7,9,11,13,15, 26; *N*=980	**CMD:** DIS (DSM criteria) Depression; **SEP:** 6-point scale of social class. **Confounders:** Childhood SEP, adult SEP gender, infant health (including birth weight), adult SEP	'Low' vs. 'high' childhood social class association with depression: OR 0.63 (0.34, 1.14), adj. for adult SEP, other confounders	'Low vs. high' adult social class association with depression: OR: 2.30 (1.34, 3.96), adj for childhood SEP, confounders	At age 26 adult social class was a stronger predictor of depression than childhood social class
Kuopio, E Finland Harper *et al* 2002 [169]; age 42, 48, 54, 60; *n=3343* men	**CMD:** Cynical distrust, hopelessness. 'Human population laboratory depression index' for Depression; **SEP:** Childhood: education, parental occupation & education (age 10)	Age adjusted parental education and occupation (or with both added) showed that men who had both parents in low/low (vs. high/high occupation or education) had higher mean scores for	Age adjusted models for adulthood SEP showed associations with increased mean scores on cynical hostility & hopelessness, after adjusting for childhood SEP. For depression- respondent's	Depressive symptoms were associated with adult SEP. Parents' education + respondent education, occupation and income all had independent effects (mutually adjusted for each other) on cynical

Study, author, *N*, gender	Measures for CMD, SEP, confounders	Childhood SEP associations with adult CMD	Adulthood SEP associations with adult CMD	Conclusions
	(recalled). Adulthood education, occupation, income. **Confounders:** Age. Models adjusted for adulthood and childhood SEP together	depression, hopelessness and cynical hostility.	income and occupation were associated with depression, but not with education.	hostility and hopelessness in adulthood.
Newcastle, England Sadowski *et al*, 1999 [170]; 296 children in 1952. Age 33: 130 women, 132 men	**CMD:** Semi-structured open ended interview similar to the SADS for DSM-IIIR Depression' **SEP:** Childhood overcrowding, 'social dependence'. 'Poor' physical care & mothering, family/ marital instability, parental illness. **Confounders:** Multiple disadvantage at age 5, gender, family/ marital instability, parental illness, social dependence,	People who experienced 'multiple disadvantages at age 5' had an increased OR of 2.22 (95% CI: 1.43 to 3.44) for depression at 33 (adj. for gender)	Not assessed	This study did not adjust for adult SEP. Indicators of childhood SEP were 'overcrowding' but this was included with other adversities such as family problems. This study found that children exposed to 'multiple adversities' were more likely to be depressed at 33.

Study, author, *N*, gender	Measures for CMD, SEP, confounders	Childhood SEP associations with adult CMD	Adulthood SEP associations with adult CMD	Conclusions
	overcrowding			
National Collaborating Project (NCPP) USA. Fan & Eaton 2001 [171] John Hopkins area; Ages:7-8, 27-33. *N=1824;* 53% female	**CMD**: GHQ & self-reported physician diagnosis :'emotional/ nervous condition'; **SEP:** Birth- household income and mother's education. Adulthood- own income and attained education**. Confounders:** Varied according to models but broadly comprised: race, gender, mother's education, household income at birth, adult income, adult education	All models adj. for confounders: 1. Birth risk factors; Low APGAR score (<7) associated with 'emotional/ nervous condition' (OR: 3.01, 95% CI: 1.15-7.93), depression (OR: 8.33, 95% CI: 2.57-27.01), 'general mental distress' (OR: 3.89, 95% CI: 1.46-10.38). Preterm delivery associated with increased odds of depression (OR 2.88, 95% CI: 1.15-7.22). Associations of birth 'risk factors' with later CMD was increased in children who grew up in more deprived neighbourhoods	After adj for confounders: People of low income & education in adulthood had higher relative odds of CMD & emotional distress. Note models did not adjust for childhood SEP, so unclear how far these associations were due to distal effects of childhood disadvantage	These findings support a 'sensitive periods' model in that the environment modified (reduced) the effect of birth insults on later risk of depression.

Study, author, *N*, gender	Measures for CMD, SEP, confounders	Childhood SEP associations with adult CMD	Adulthood SEP associations with adult CMD	Conclusions
		relative to affluent neighbourhoods after adjusting for adult SEP indicators		
National Collaborating Project (NCPP) USA Gilman *et al* 2002 [172]. Providence area. Ages 18, 30, 39. Baseline sample N=4140; 1780 people randomly selected at follow-up	**CMD**: DIS for Depression. First phase according to DSM-III, second phase DSM-IV **SEP:** No. of years of education, parental occupational social class at birth & age 7. **Confounders:** Family history (mother, father or sibs) of mental disorders prior to birth of cohort member, maternal age and single parent status at time	Taking parental occupational social class at two time points in childhood (age 0 and 7) authors examined change in social class; Compared to 'stable non-manual social class' at both time points, all other groups had an increased risk of adult depression. This persisted after adjustment for confounders & adult SEP. Lower levels attained education was associated with an increased risk of	Association of adult SEP with adult CMD not assessed	This study supports the notion that exposure to childhood SEP during at least one time point predicts depression independent of adult SEP. Study did not assess contribution of adult SEP independent of childhood SEP.

Study, author, *N*, gender	Measures for CMD, SEP, confounders	Childhood SEP associations with adult CMD	Adulthood SEP associations with adult CMD	Conclusions
	of birth of child, respondent's age at interview, gender and race/ ethnicity	depression after adjusting for adult SEP.		
Alameda county, USA Lynch *et al* 1997 [151]. Follow up in 1965, 1974, 1983, 1994.*N*=1081-1124; 627 women	**CMD:** DSM-IIIR for Depression; **SEP:** No. of times respondent income was <200% of poverty level (once, twice or thrice). **Confounders:** Age, gender, BMI, alcohol consumption, physical activity, smoking and prevalent disease (included a range of medical conditions)	Not assessed, the cohort started in adulthood	Cumulative dose response association with no. of times cohort member exposed to economic hardship and depression, which persisted after adjustment for all confounders	Findings support an accumulation hypothesis for later life depression (sample had a mean age around mid 60s by time of assessment), although note that childhood was not assessed.

As can be seen in Table 3-1, in most of the studies, measures of socioeconomic position were generally available for childhood and adulthood. Childhood socioeconomic position indicators tended to rely on measures of parental socioeconomic position, such as parental social class, education or income. Socioeconomic position in adulthood was taken as the cohort members' own attained socioeconomic position. Comparison across studies is difficult as each adjusted for differing confounding factors or mediators, and in addition assessed different time points over the life-course, in differing national contexts. However, of the studies summarised in Table 3-1, evidence in support of a number of life course epidemiological mechanisms are apparent. In two studies from America, the findings supported a 'social origins' model of depression in that early socioeconomic disadvantage in childhood predisposed to adult common mental disorders, after adjusting for adult socioeconomic position [167, 168]. In one study, the investigators also examined the role of socioeconomic position in childhood in mitigating the effects of biological insults at birth [167]. Low APGAR scores at birth and pre-term delivery increased the risk of common mental disorders in adulthood in this study, with the risk greatest in children born into and raised (to age 7-8) in a lower socioeconomic position [167]. The findings of this study therefore also supported a 'sensitive periods' model in that later environmental factors had the ability to modify earlier insults [33].

Two studies using data from America[151] and Britain[169] found evidence in support of accumulation models of adversity for depression. Unlike most of the other studies shown in Table 3-1 the contribution of childhood emotional and psychological health in predicting later life socioeconomic position and mid-life common mental disorders was also assessed in the study from Britain [169]. Children exposed to a lower SEP (2+ times versus 0-1 times as assessed through parental social class and tenure) had a small increased risk of common mental disorders at mid-life (OR 1.28 (95% CI: 1.00-1.62) after adjusting for gender and adult SEP, but this diminished after adjusting for childhood psychological disorders, suggesting that childhood psychological disorders might mediate the association of childhood SEP with mid-life common mental disorders [169]. In contrast, adult cumulative exposure to a manual SEP was also associated with mid-life common mental disorders, and this association remained even after adjustment for

childhood psychological health [169]. The authors suggest that the weaker distal associations of childhood SEP relative to adult SEP with common mental disorders may represent the attenuation of adverse associations between social class and mental health over time [169].

In these studies, adult SEP was a stronger predictor of adult common mental disorders (with a larger effect size than childhood SEP), after taking into account childhood SEP [35, 170, 171]. In an equivalent analysis of the NCDS which broke down common mental disorders by diagnosis (depressive symptoms versus anxiety symptoms), the authors found that whereas there was a gradient between parental social class and depressive symptoms, this was not the case for anxiety symptoms [170]. Stronger associations between adult occupational social class and depression but not generalised anxiety disorder were seen in a related analysis from the same dataset, which led the authors to suggest that although anxiety and depression frequently get grouped together as 'common mental disorders' associations with life-course disadvantage measures may differ by disorder[171].

Childhood adversity and adult common mental disorders

Although there may be a tendency to lump together material disadvantage with childhood adversity, there is no reason to suppose that living under circumstances of material disadvantage should necessarily predispose children to also grow up under circumstances of childhood trauma, abuse, neglect or family/ parenting difficulties [164]. Rather, as Rutter suggests, economic hardship may increase the risk of parenting difficulties and familial tension, but this is not necessarily a given [164]. The previous section specifically focussed on the role of childhood versus adult socioeconomic position in predicting adult common mental disorders; in the following section I shall review key studies that have examined associations between childhood adversity and later adult common mental disorders using cohort study designs.

Several British cohort studies have been used to examine the association of psychosocial adversity with later adult psychopathology [120, 172-174]. Investigators examining data from NCDS and BCS70 have found strong associations between several prospectively

assessed childhood psychosocial adversity indicators and psychological wellbeing at age 30/ 33[173], as well as at age 16, 23 and mid-life (44/ 45) [120]. Prospective associations with psychopathology at age 30/ 33 in NCDS and BCS70 were with: childhood family disruptions, parental interest in child's education, behavioural problems, academic achievements, and health difficulties[173]. Effects were equivalent across cohorts and persisted after adjustment for gender and other adversity variables [173]. In another analysis of data from the NCDS, the investigators assessed psychopathology at 16, 23, and mid-life [120]. After adjustment for gender and SEP, mid-life common mental disorders were predicted by the following childhood adversity variables in this study: illnesses in the household, the child having a neglected or underfed appearance at age 7 and/ or 11, and parental divorce prior to age 16 [120].

Akin to the 'accumulation of risk' models in life-course epidemiology discussed in the previous section. investigators using data from two British birth cohort studies found cumulative associations between the number of times people were exposed to psychosocial adversities, and their later risk of adult psychopathology [120, 174]. Related to this, multiple psychosocial adversities cluster together in individuals and in families [148, 175], and this 'clustering of risk' is not just limited to economic hardships. For example, children whose parents separate or divorce may also be exposed to a number of other associated risk factors, such as ongoing conflict between parents, loss of financial security/ economic status, and reduced parenting effectiveness [162]. Therefore to assess single adversities may be misleading [175].

Finally, 'pathway models', in which psychosocial adversities lead to later life depression or common mental disorders, may also be important. Depression is rare in childhood, and has stronger associations with adult risk factors such as stressful life events or social support. Therefore it has been suggested that the pathways through which childhood adversity mediates adult depression are complex and linked to a number of intermediary processes, not necessarily through the direct associations of childhood psychopathology only [162]. For example, the accumulation of adverse environmental exposures subsequent and related to earlier childhood adversity, may in themselves increase the risk of adult common mental disorders[162]. This would be in keeping with a study using data

from the NCDS in which the investigators found that childhood adversities were associated with poorer social networks at mid-life, as well as negative aspects of close relationships; both social networks and negative aspects of close relationships were associated with an increased risk of mid-life common mental disorders [176].

Alcohol and tobacco use

In this section I consider the life-course literature around alcohol misuse and tobacco use. This literature is especially complex, given the possibility of period and cohort effects, and the difficulties in comparing findings across cultures. As the literature is vast, I have chosen to discuss a few noteworthy studies in this section.

Tobacco use

Associations with strong social class gradients have been previously noted in studies examining tobacco use [35, 177-181], although these are known to vary over time, place and cultural contexts (cited in [180]). To account for these gradients, investigators working within the field of life-course epidemiology have suggested a number of possible mechanisms. For example, exposure to a lower social class position or social adversity may increase the risk of tobacco use in a cumulative fashion over the life-course [177, 182]. A cumulative dose-response association was found between the number of months men had been unemployed, and the relative odds of tobacco use, at age 33, in a study using data from the NCDS [182]. In addition, it has been noted that there are strong social class gradients associated with nicotine dependence and intention to quit[183], which may mediate social class gradients in smoking.

In other studies, investigators have examined tobacco use over the life-course after adjusting for childhood and adult SEP [35, 148, 177], and have specifically examined the notion that behaviours which are usually perceived as ‘adult risk factors’ actually develop in childhood/ adolescence and then track into adulthood [148, 180, 184] . In addition earlier childhood disadvantage might predict later tobacco use. For example, adult tobacco use was associated with childhood disadvantage and adversity, in a study using data from the Dunedin cohort [148]. In a study using data from the NCDS, the authors found that in men, childhood socioeconomic position was associated with persistent

smoking over the life-course[177]. This association diminished in men after adjusting for adult SEP, although persisted in women [177]. Similarly, using data from a cross-cohort comparison study of seven population based studies from six Western countries, the investigators found that women who were of a manual social class position in childhood were less likely to quit smoking and more likely to be smokers in adulthood, even after adjusting for adult SEP, with this association not found in men [180].

Alcohol use

The picture for alcohol use is less consistent. There is some indication that cumulative exposure to social disadvantage may predispose individuals in an additive fashion to problem drinking behaviours [182, 185, 186] or mid-life binge alcohol use[186], and a 'social origins' model may account for adult alcohol use, whereby childhood SEP, independent of adult SEP, might predict later alcohol dependency [35, 148].

On the other hand, evidence from other studies [185, 186] and a systematic review [187] have contradicted this. In other studies, the distal associations of childhood SEP with later adult problem/ heavy alcohol use, appear to be, at best, weak[187], and where they do exist may be mediated by adult SEP [185] or by educational attainment[186]. In addition, *persistent* disadvantage over childhood and adulthood may be more predictive of moderate-binge and problem drinking[186]. In general, strong and large associations between problem or heavy alcohol use with adulthood measures of disadvantage have been observed, with much smaller and weaker associations with childhood disadvantage measures [185-187]. In addition, the social class gradient for alcohol misuse has been less consistently noted than with other health outcomes (cited in [186]), especially with respect to heavy drinking (cited in [188]). A systematic review did not find support for an association between childhood adversity and later alcohol use and misuse[187], also supported in another systematic review[181]. However, in this latter review there was some evidence in support of an association between childhood and family adversity and initiation of alcohol use[181].

In contrast to 'problem alcohol use' or 'heavy drinking', 'binge' alcohol use refers to drinking to intoxication levels in a single sitting, although there is no consensus as to

what levels of alcohol use should constitute a 'binge' episode, making comparisons across studies difficult [189, 190]. Patterns of binge alcohol use frequently exist in people with otherwise unproblematic alcohol use [186], although in previous studies have been shown to predict alcohol dependence and abuse, psychological morbidity and numerous social problems such as homelessness, lower adult SEP, convictions, accidents and lower educational attainment, in adolescents [191] and possibly incident anxiety and depression[192], as well as other social problems relating to family conflict, physical injuries and fights[193]. Binge alcohol use is extremely common at all ages in Britain [192, 194].

There is some suggestion from the literature that drinking behaviours may become established in adolescence and then continue to 'track' into adulthood. For example, in an analysis using data from NCDS, the investigators found that drinking behaviours prevalent by mid-life showed continuities with behaviours established in adolescence and in the early 20s [194]. Another study confirmed this finding, as adolescents who were frequent drinkers were more likely to be dependent in adulthood [195].

Age, period and cohort effects in tobacco and alcohol use

Health-related behaviours may be more sensitive than other health outcomes to external influences such as policy[196], cultural and social attitudes[194] as well as media influences and advertising[197]. Therefore it may be presumed that trends in these behaviours may be more sensitive to period or cohort effects.

For alcohol use, a recent analysis of longitudinal data from Scotland suggested that for the younger cohorts studied, especially those born in the 1970s, the gender differential between men and women in heavy drinking had narrowed relative to the older cohorts[198]. High levels of binge alcohol use in men in all three birth cohorts was found, suggesting that although there may be a trend for younger people to engage in binge alcohol use, this is a behaviour which is also prevalent in older age groups[198]. Although the authors suggested that changing attitudes towards women's roles in society might have acted as a period effect in lessening gender differentials in alcohol misuse over cohorts, the authors also cautioned against attempting to disentangle age, period and

cohort effects from their data[198]. These findings have been replicated in cohort data from the NCDS in which binge alcohol use was more prevalent at younger ages, although still remained fairly prevalent at older ages[194]. The authors in this study also found a smaller gender differential at younger ages[194] and also highlighted the challenges in attempting to disentangle age and period effects[194].

For tobacco use, a concerted campaign leading to policy changes in Britain, Europe and other parts of the world has had a substantial impact on smoking behaviours and related health outcomes[199-201]. Corresponding to this, there has been a substantial decline in tobacco use in men and women in the UK over the last few decades, although gender differentials in smoking prevalence have also reduced, with women now smoking at levels closer to that of men[202].

Self-rated health and mortality

The final health outcome to be considered in this chapter, is self-rated health, and related to this, mortality. Chapter 3 highlighted a large literature which has shown persistent elevated mortality in second and later generation Irish people living in Britain [9, 10]. Although I am unable to directly assess mortality in the cohorts as there have not been a sufficient number of deaths for an analysis to be adequately powered[36], I will instead assess self-rated health, which is known to be a predictor for mortality[73].

Self-rated health

Two reviews [203, 204] and one systematic review [73] have demonstrated that a single item question asking respondents to rate their health globally shows strong predictive validity with later mortality. Usually the question is a simple statement such as *"How would you rate your health status presently?"* with respondents invited to rate their health on a four or five-point ordered scale, for example rated as "excellent", "good", "fair" or "poor" [73]. Although variations of the wording of the question exist, as do the inclusion/

[36] By 2009 there had been 1474 deaths within NCDS of which 739 were perinatal deaths occurring in 1958. To date there have been too few events for further meaningful analysis to be conducted in these two groups.

exclusion of time frames for reference[205, 206], no consistent differences have been found with variants of this question and its ability to predict later mortality[73, 203, 205], or its association with potential determinants [206], suggesting that the underlying construct is not affected by wording or phrasing of the question [205]. Of note, the association of self-rated health (SRH) in predicting later mortality or survival persists after accounting for standard health risk factors [203], depression, functional status, socioeconomic status and cognitive function [73], although there is some evidence to suggest that it is a more accurate predictor of survival in the shorter term than the longer term[207]. It has also been found to show consistent associations with survival in other cultural and international contexts [204, 208], and shows consistent associations with morbidity across ethnic minority groups [209]. Associations with gender are less consistent- investigators in some studies have suggested greater predictive validity for survival in men compared to women [210] others have suggested the reverse (cited in [210]), and still others have suggested no differences by gender [207].

The following table (*Table 3-2: Life course associations with self-rated health; selected studies)* summarises noteworthy studies on self-rated health.

Table 3-2: Life course associations with self-rated health; selected studies

Reference, study design, country, *N*	Exposures, outcomes	Association of Childhood SEP with SRH	Association of adult SEP with SRH	Adjusted associations
Hyde et al 2006 [211]; Assessment of three population based cohorts and one occupational cohort; England, Netherlands, France, Germany; *N*= England- 3615; Netherlands- 3801; France- 11595; Germany- 4183	**Exposures:** Father's social class in childhood (recalled) and own occupational class in adulthood; **Outcomes:** SRH in all studies except from France were on a 5 point scale, dichotomised into good health/ poor health. In the French study an 8-point scale assessed SRH- lowest third of distribution was 'poor health'. SRH assessed at mid-life (late 40s/ 50s)	OR (95% CI): England: 1.93 (1.47, 2.54). France 0.91 (0.75, 1.12), Germany 1.04 (0.77, 1.41), Netherlands 1.98 (1.27, 3.10)	OR (95% CI): England: 1.86 (1.40, 2.47), France: 0.85 (0.29, 2.49), Germany 1.41 (0.98, 2.03), Netherlands 2.03 (1.30, 3.18)	(Models adj for childhood and adult SEP simultaneously): OR (95% CI): England- childhood 1.75 (1.33, 2.32), adult 1.60 (1.17, 2.18), France: childhood: 0.85 (0.29, 2.50), adult: 0.92 (0.75, 1.12). Germany: childhood: 0.69 (0.44, 1.06), adult 1.62 (1.06, 2.49). Netherlands: childhood: 1.75 (1.10, 2.79), adulthood: 1.68 (1.06, 2.67)
Regidor et al 2011[212];	**Exposures: (**Recalled from	Lower adolescent SEP	After adj. for adult	Evidence of partial and

Reference, study design, country, *N*	Exposures, outcomes	Association of Childhood SEP with SRH	Association of adult SEP with SRH	Adjusted associations
Two cross-sectional surveys assessing adults born between 1941 & 1959, and 1960 & 1980; Spain; *N*=16383	adolescence) Financial problems, parental education. Current measures: financial problems, occupation, education; **Outcomes:** Poor health vs. good health. Subjects aged 52-70 or 31-51 when question on SRH asked	associated with SRH, after adj. for age	measures of SEP, evidence of cumulative associations between each SEP indicator across the life-course and adult SRH	complete mediation of adolescent SEP /SRH associations by adult SEP indicators across most measures. However for 'adolescent financial difficulties' mediation effects by adult SEP were partial, and associations remained after adult SEP measures were added into models (i.e. association between presence (vs. absence) of adolescent financial problems and later SRH after adjustment of adult SEP: OR (95% CI) Born 1941-1959: Men 1.22 (1.09, 1.36), Women:

Reference, study design, country, *N*	Exposures, outcomes	Association of Childhood SEP with SRH	Association of adult SEP with SRH	Adjusted associations
				1.25 (1.14, 1.38). Born 1960-1980: Men: 1.49 (1.27, 1.74), Women: 1.27 (1.09, 1.48)
Singh-Manoux et al 2006[213]; Analyses of cross-sectional sweeps of Whitehall (England) and Gazel (France) cohorts. *N*=27988	**Exposures:** Age, early life factors, family history, father's social class and height, psychosocial factors, health behaviours, measures of health and disease. Adult education, material difficulties, employment grade, income **Outcomes:** Self-rated health	Measures for childhood SEP had low or non-significant correlations with SRH, both cohorts	Positive correlations between adult SEP and SRH but were low	In fully adjusted analyses a small subset of variables accounted for adult SRH. These were: (Whitehall) Symptom score, sickness absence, longstanding illness, minor psychiatric morbidity (GHQ), number of recurring health problems. (Gazel): Feeling physically tired, number of health problems in the previous year, physical mobility, number of prescription drugs.

Reference, study design, country, *N*	Exposures, outcomes	Association of Childhood SEP with SRH	Association of adult SEP with SRH	Adjusted associations
Power et al 1998[51]; Data from NCDS to age 33; England, Scotland, Wales, *N*=11405	**Exposures:** Social class, birth, tenure age 11, behaviour age 16, school absence age 16, smoking age 16, qualifications, unemployment age 23, 33, smoking 23, 33, work psychosocial factors, 33, tenure 33, social security 33, job insecurity age 33 and mortgage/ rent arrears age 33, age at first child. **Outcomes:** Participants rated health at age 23, 33	Adding childhood SEP variables (social class at birth, tenure at age 11) into models partially attenuated the association of adult social class with SRH	Social class gradient with SRH at age 23 and 33.	Authors compared social class V/ VI to I/II for SRH at age 23. 33 and assessed impact of adding variables over into models. All variables partially attenuated the association of lower adult SEP with SRH. Tobacco use had the greatest impact in reducing ORs, family structure and social support had a negligible impact on ORs, job insecurity and psychosocial job strain at age 33 had a reasonable effect, and adult SEP variables had a notable effect on ORs, as did social class at birth and tenure, age 11

Reference, study design, country, *N*	Exposures, outcomes	Association of Childhood SEP with SRH	Association of adult SEP with SRH	Adjusted associations
Bosma et al 1999[214]; cross-sectional survey; Netherlands; *N*=2174	**Exposures:** Childhood (paternal) and adult social class, psychological attributes (e.g. personality traits such as neuroticism and coping styles) and general health; **Outcomes:** SRH. Respondents aged 45-70 years at time of assessment.	Social class gradient of childhood social class with all adult psychological variables. Gradient between childhood SEP and SRH evident.	-	Social class gradient of childhood social class with all adult psychological variables persisted after adjustment for adult SEP. Association of childhood SEP with SRH remained after adjustment by adult SEP. Addition of psychological variables into models with childhood SEP and SRH attenuated associations, suggesting that psychosocial characteristics may mediate the association between childhood SEP and adult SRH.
Kestila et al 2006[215]; Cross-sectional survey;	**Exposures: (**Childhood): Parental education, family	Mother's education (especially for women),	Educational attainment was associated with SRH	Childhood associations remained unchanged after

Reference, study design, country, *N*	**Exposures, outcomes**	**Association of Childhood SEP with SRH**	**Association of adult SEP with SRH**	**Adjusted associations**
Finland; *N*=3669;	structure, childhood adversity (parental financial problems, unemployment, divorce, parental alcohol, mental health or serious disease/ disability, own illness, bullying, family conflict. (Adulthood): Education. **Outcomes:** SRH reported at age 18-39	family structure (in men), & childhood adversities in both genders were associated with SRH.	in men and women	adjusting for adult educational attainment

A few common themes suggest themselves from the studies displayed in Table 3-2. First, approximately half of the studies were cross-sectional in design whereas the others were of a cohort design. In only one study [51] the measures for childhood adversity and childhood socioeconomic position were prospectively assessed. As described previously, this is a methodological issue as it is could mean that these measures are prone to recall bias (especially in the cross-sectional studies, if SRH and previous life adversities were asked at the same time points). In addition, whereas there were clear associations between adult SEP indicators and adult SRH across most of the studies displayed in Table 3-2, the association of childhood SEP with adult SRH was less consistent. Where associations between adult SEP and adult SRH were evident, investigators found support for accumulation models of disadvantage [212], as well as evidence for a social class gradient between adult SEP and SRH [51].

The complexities of teasing out the relative importance of childhood versus adulthood exposures in accounting for later life SRH are evident. For example, whereas childhood disadvantage was associated with later life SRH even after adjusting for adult SEP or later life adversity indicators in some studies [211, 212, 214, 215], in other studies adult SEP indicators fully attenuated associations of childhood disadvantage with later life SRH [212], or partially attenuated associations [211, 212]. This could be due to the type of measure for disadvantage which was used; in one study, financial difficulties in adolescence continued to be associated with SRH in adulthood after adjustment for adult SEP measures, whereas the other measures for disadvantage in adolescence (parental education) were not [212]. In two studies, notably both using data from France, there was no evidence of an association of childhood SEP with adult SRH [211, 213]. Of interest, there was evidence that adult 'psychosocial characteristics' such as neuroticism and coping styles, mediated associations between childhood SEP and SRH in one other study[214].

Although most investigators assessed the association of childhood adversity or SEP with later life SRH *and then* adjusted for adult SEP or other adult measures (thus assessing the potential role of adult mediating variables in accounting for childhood SEP/ adult SRH associations), in one study the investigators assessed the association of

adult SEP with SRH at age 23 and 33, and then took into account earlier measures such as childhood and earlier adulthood disadvantage, through statistical adjustments in regression models [51]. In general the association of adult SEP with SRH persisted in this study, although the authors were able to show 'the contribution' of earlier life factors such as childhood adversity or earlier smoking behaviours 'in accounting for' later life associations [51].

Therefore in summary, it would seem that there are many inconsistencies within the literature for SRH, with some support for a 'sensitive period' model of childhood adversity; or the notion that lower SEP in childhood may predispose individuals to poorer adult health (SRH), independent of adult SEP indicators. However the associations are by no means consistent, with other studies suggesting the importance of psychosocial factors and adult health indicators (both mental and physical health) in potentially mediating associations, and more consistent evidence suggesting a greater role for adult SEP in accounting for adult SRH. In addition, the varied settings, time periods and ages of participants in the studies displayed in Table 3-2 may have also led to the inconsistencies across studies.

Mortality

In two separate systematic reviews, investigators examined the role of childhood socioeconomic circumstances and material adversity in the aetiology of cause-specific mortality [34, 147]. The cohorts included in the reviews came from different regions, which included the United Kingdom, the United States, Russia and Europe[34, 147]. The later review, (which was an update), included more deaths, a greater representation of females, and also included younger cohorts [34]. The authors found that there were clear associations between all-cause mortality and childhood SEP, independent of adult SEP across almost all studies [34, 147], save one from France [34]. Of note, the authors found that mortality risk was not mediated by adult SEP and remained a consistent finding even in the more recent cohorts, where there had been discernible improvements in living standards in childhood [34, 147]. In addition, the association of SEP with mortality was found to be similar across both genders[34]. The authors cautioned that for cause-specific mortality, the role of childhood adversity in patterning mortality risk

was not the same across causes, and that there are differing underlying mechanisms[34, 147].

Of note, the authors highlighted the findings of a study where the intergenerational transmission of socioeconomic conditions across subsequent generations (cited in [34]) had been examined. This study examined socioeconomic circumstances and mortality across three generations of a cohort of Danish men, born in 1953 [216]. In this study all-cause mortality increased in a cumulative fashion with increasing numbers of parents/ grand-parents who had been of a manual social class position[216], suggesting that accumulation models of disadvantage may not just be restricted to one generation, showing continuities with subsequent generations. The authors in the latter study suggested that parental socioeconomic position had an impact on 'resources for care' for their children (the next generation) in early life, which would potentially continue to have an impact on growth/ development and downstream adult health[216]. This finding potentially is relevant potentially, to understanding health inequalities in second generation Irish people- a point to be discussed further in Chapter 5.

Final comments and critique

In the first part of this chapter I discussed the historical development of some of the main theories which underpin the field of 'life-course epidemiology'. Specifically, these related to theories around 'the foetal origins' or 'critical periods' hypothesis, 'sensitive' periods, 'accumulation models' of risk, 'pathway' models and social mobility models, with some investigators attempting to disentangle the contribution of competing mechanisms to health outcomes[35, 158, 159].

Many of the proposed mechanisms overlap and are not mutually exclusive. For example, if an individual experiences childhood adversity and then is upwardly mobile, their risk of later disease might be accounted for either through an 'accumulation' model of risk (exposed to adversity at one time point over the life-course only), or a 'sensitive' period model (exposed to adversity in childhood only), or a social mobility model, whereby earlier adversity may be modified by later upward mobility[159]. This creates challenges to empirically testing competing mechanisms, with some investigators likening the problem to disentangling age, period and cohort effects[158]. Equally, investigators wishing to assess more complex models such as 'pathway models' of risk, will be thwarted as most cohorts have measures of health taken at discrete time points, that do not enable assessment of continuous trajectories[149]. In addition, as proposed pathways are frequently complex and overlapping, the risk of over-adjustment (for example of mediators) or a lack of adjustment for important confounders may lead to biased estimates[149]. A further criticism of the research to date is that where analytic paradigms do exist to test hypotheses (e.g. path analysis to assess pathway models) these have been in the main, been under-utilised (for a notable exception to this, see the study by *Chandola et al*[217]). Finally, as suggested by the authors of a systematic review evaluating the role of socioeconomic factors over the life-course for cardiovascular disease, another limitation in all of these studies has been in the use of disparate measures for socioeconomic position which may not all tap into the same types of disadvantage, hindering comparison across studies and potentially across time[149].

However the models and studies reviewed in this chapter all support the notion that social disadvantage and/ or adversity are associated with a number of adverse adult health outcomes and behaviours. Furthermore, some of these processes (e.g. social mobility) may differ for migrant or ethnic minority groups, particularly if geographical relocation is associated with exposure to new adversities, which in themselves may 'transmit' to the next generation through the childhood or family environment[216].

To assess the notion that social mobility processes may differ in migrant groups as well as in their progeny, I conducted a separate systematic review of studies assessing this as a risk for common mental disorders. This review is presented in the next chapter.

4 Migration, social mobility and common mental disorders. Systematic literature review and meta-analysis

Introduction

In the first two chapters of this thesis I outlined a large literature which has detailed the stark health inequalities which have affected Irish people living in Britain. A consistent feature across many of the studies has been the persistence of health inequalities across generations, despite apparent improvements in socioeconomic position. In Chapter 2, I discussed previous work which has suggested that second generation Irish people may experience higher differential upward social mobility relative to people without a parental history of migration.

In Chapter 3, I outlined a literature which has examined the role of adversity and material disadvantage over the life-course on both mental and physical health outcomes in adulthood. I also discussed the possibility that both migration and social mobility may interact over the life-course to pattern the risk of certain health outcomes, such as common mental disorders, in first and second generation ethnic minority groups.

The following chapter presents the findings from a systematic review and meta-analysis, which was designed to assess the dual processes of migration and social mobility in the patterning of common mental disorders. This review and meta-analysis will inform a theoretical framework for the main analyses for this thesis (discussed in the next chapter).

Background to the review

Over the last thirty years global migration has increased rapidly, as a consequence of globalisation, industrialisation, changing labour markets, post-colonial factors and displacement related to conflict [218, 219]. In 2005 global migration was estimated to stand at 195 million, with 10.5 million people recorded as international refugees by the end of 2011 [220].

As briefly mentioned in Chapter 3, studies of social mobility in people migrating to Britain [53, 54], other parts of Europe[221, 222] and North America [223, 224] suggest that many migrants pay an 'occupational penalty' in order to move and work internationally[53, 54]. 'Occupational penalty' encompasses an individual working below one's levels of skills and qualifications ('underemployment'), or working in occupations below one's pre-migratory socioeconomic position ('downward mobility'). This may also be thought of as a form of intra-generational social mobility, in that it captures changes to socioeconomic position within the same life-course. The occupational disadvantage experienced by migrant groups has been attributed to a number of factors. These include racism and discrimination, lack of cultural knowledge and language fluency, or overseas qualifications not being recognised [54]. Although some studies have examined the association of social mobility in migrant and second generation groups with self-reported limiting long-term illness[160], general health [55] and mortality [225], there has been scant work on the association of social mobility with mental health in migrant groups.

In addition, the growth in minority ethnic populations is mostly explicable by the relatively high fertility rates among migrant groups. Rates of mental disorder among second generation groups in many countries are consistently high [28, 226]. The factors which relate to social mobility and mental disorders for these groups are poorly understood [1].

A British study suggested that second generation groups were more likely to experience greater upward (intergenerational[37]) social mobility compared to their White British peers, and were more likely to end up in a higher social class than their parents [53]. This may partly be accounted for through the downward mobility which their parents experienced in migrating to Britain [53]. Other factors promoting intergenerational social mobility may relate to education[53], or as suggested by Beiser and colleagues

[37] Changes to socioeconomic position across generations, has been termed *intergenerational* social mobility.

using data from Canada, whereas "*poverty may represent a transient and inevitable part of the resettlement process for new immigrant families... for long-stay immigrant and receiving-society families… poverty… is not part of an unfolding process; instead, it is the nadir of a cycle of disadvantage*" [227]. Thus the life-course socioeconomic trajectories of second generation groups may not be the same as children without a parental history of migration, and may also have differing mental health consequences.

There is also a growing body of evidence linking migration as a potential risk for mental disorders, with posited associations for schizophrenia [228] and common mental disorders [229]. Economic circumstances in the host country, alongside reasons for migration, may play an important role in accounting for the differing prevalence of common mental disorders in migrant groups [229, 230]. The wider literature suggests an association between lower socioeconomic position and both onset and persistence of depression [165]. The way in which this may pattern the mental health of migrant groups is less certain, particularly as departure and settlement may expose people to at least two different economic systems (both in the country of origin and in the receiving country) [1].

Using data from observational studies (case-control, cohort and cross-sectional surveys), the association of downward social mobility (relative to upward/ stable social mobility) with common mental disorders in international migrants was assessed in the present review. The main hypothesis to be tested is that international migrants experiencing downward social mobility are more likely to screen positive for common mental disorders, relative to those experiencing stable/ upward social mobility.

In this chapter I will also examine how this impacts on the children of migrants, who may have socioeconomic trajectories which differ from the non-migrant population in the receiving country [53, 54], as this issue is obviously crucial to understanding the impact of intergenerational social mobility in second generation Irish people in Britain. Finally, I will critically review the methods taken to operationalise 'social mobility' in studies of migration and mental health.

Methods for the systematic review and meta-analysis

The guidelines for Meta-analysis of Observational Studies in Epidemiology (MOOSE) were followed in the planning of the review and reporting of findings [231]. Systematic searches were conducted in the following databases: Medline, Ovid, Psychinfo, Embase, Social Policy and Practice, British Nursing Index and Archive. Searches were conducted from November 2009-February 2010. Due to limited resources only English-language papers and dissertations were considered.

Keywords and mesh headings used for searches were: "mental disorders"; "mental health", "depress*", "anxiety", "psych*"; Intrageneration* mobility, Intergeneration* mobility, underemployment, *mobility, Migra*, immigra*, emigra*, refugee*, asylum*. Searches were supplemented by contacting first authors of each included study, and experts in the field, to ensure that unpublished work could also be reviewed. Bibliography sections of papers as well as one review[230] were hand-searched for additional references. Where it was unclear if the paper met inclusion criteria the paper was retrieved and examined. If results from a study had been published in more than one source then all papers were retrieved and presented as findings from one study.

Exclusion criteria were: Studies not using a structured instrument or clinical interview to assess psychological well-being and common mental disorders, ecological or qualitative studies, studies not reporting original data.

I performed all of the searches. Discussion with my primary supervisor (Professor Prince) helped to resolve issues relating to inclusion/ exclusion for some of the studies. The quality of studies was assessed using the criteria shown in figure 1. In acknowledgement of the diversity of ways in which social mobility is defined in the literature[156], inclusion criteria for definitions of 'social mobility' were kept purposefully broad and simply had to reflect change in socioeconomic position across two time points either within the same generation ("intragenerational social mobility") or between generations ("intergenerational social mobility"). Post hoc, I decided to critically examine the variety of approaches used to assess social mobility.

Figure 4-1: Quality criteria and sources of heterogeneity

Quality criteria

1. Cross-sectional, cohort, case-control
2. Response rates (<60%/ >60%)
3. Sampling methods (convenience vs. random)
4. Sample size (<50/ >50)
5. Attrition (if prospective)
6. Methods to define migrant group or ethnicity
7. Assessment of confounding and interactions
8. Instruments used to assess common mental disorders
9. Methods used to define social mobility, underemployment

Source of heterogeneity

1. Reason for migration (labour migrant versus refugee/ asylum-seeker)
2. Geographical destination
3. Country of origin

The main outcome variable in meta-analysis and narrative synthesis was the presence of 'common mental disorders'. This term refers to neurotic disorders commonly encountered at the level of primary care, associated with disability and impaired functioning. The use of screening tools or diagnostic assessments result in either 'counts' of symptoms whereby a higher score indicates greater distress and disability, or utilises cut-points usually validated against suitable 'gold standards'. For the purposes of this review I retained studies employing both approaches.

Statistical analyses

Analyses were performed in STATA/IC 10.1 [232]. Meta-analysis was used to assess the association of downward social mobility (relative to upward/ stable social mobility) in migrants with common mental disorders. The dependent variable in meta-analysis was common mental disorders as assessed through instruments employing validated cut-points. Using this approach we derived the overall pooled OR from all of the studies on migrant groups, and then investigated this according to the sub-groups/ criteria given in Figure 4-1. Pooled estimates for the odds of downward social mobility and common mental disorders (relative to migrants who experienced stable/ upward social mobility) were estimated using DerSimonian and Laird's method [233]. In calculating odds ratios, wherever a 0 occurred in any cell of the 2x2 table, a correction factor of 0.5 was added [234]. Where meta-analysis was not possible (i.e. those studies which employed continuous measures for CMD and where the underlying constructs differed) studies were qualitatively appraised against extracted quality criteria (Figure 4-1), and a narrative synthesis of results performed.

A priori, I assumed that a random effects meta-analysis would best capture the variability between studies, (e.g. due to differing migratory contexts, geographical regions and study designs).

Assessment of study quality

Sources of heterogeneity (Figure 4-1) were explored by visually examining forest plots, and through the I^2 statistic[235]. Tentative I^2 statistic cut-offs to assess heterogeneity

are: <25% (low), 50% (moderate) and 75% (high) [235]. Meta-regression was then used to assess whether there was formal statistical evidence of a difference in ORs (for the association of downward social mobility with common mental disorders) by a priori sub-groups [235, 236]. Meta-regression assesses the association of covariates (in this case these were the sub-groups shown in Figure 4-1) in accounting for the association of downward social mobility with common mental disorders. For ease of interpretation, meta-regression coefficients were exponentiated, giving a ratio (or a 'ratio of odds ratios') [237].)

Results

Figure 4-2 summarises all studies which were retrieved through searches and the reasons for their exclusion. Of 90 studies identified through searches[38], 12 studies met inclusion criteria . Only two studies included second generation groups. Studies covered the years 1978 to 2010. All studies were conducted in higher income countries and included two studies from North America, three from Europe and Israel and one from New Zealand (see Table 4-1).

[38] Two unpublished studies were also identified through searches, however the results of these were not available at the time of compiling this review. This included one study from the USA *(CM Abdou-personal communication)* and one study from New Zealand (*A.Sobrun-Maharaj- personal communication).*

Figure 4-2: Flow chart of retrieved studies

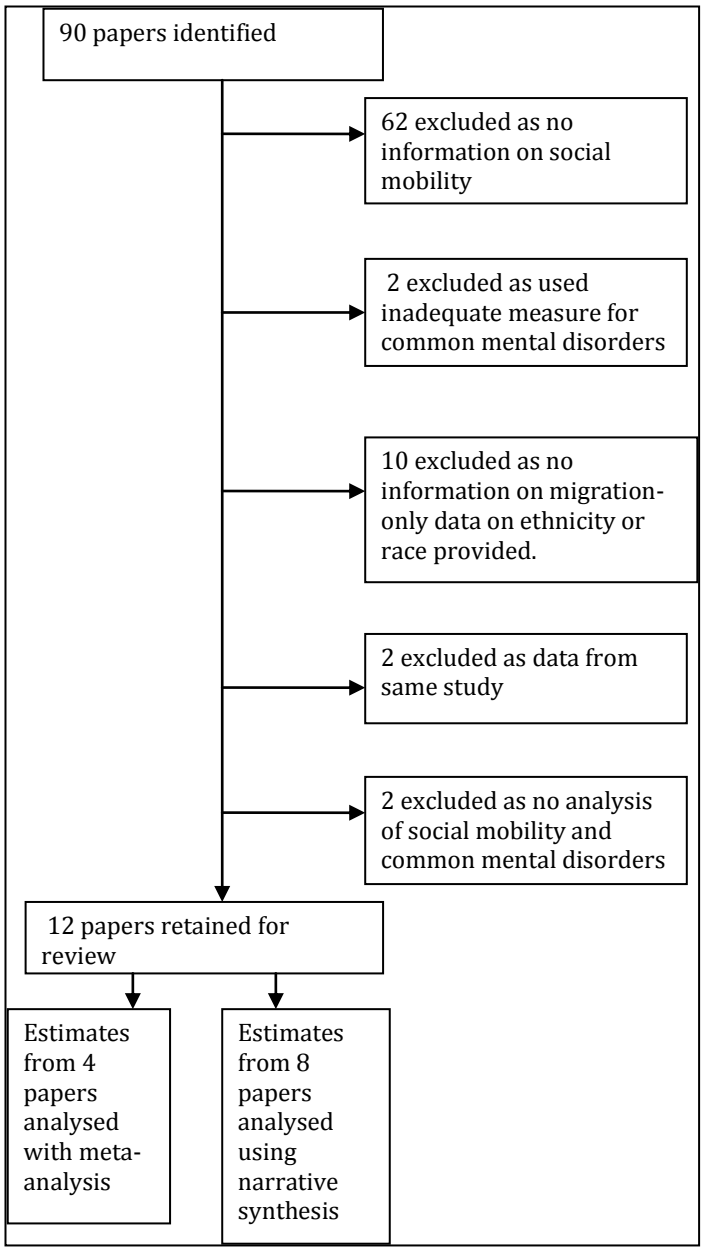


Table 4-1: Study characteristics

	Number of studies	**Total participants N (%)**
Total	12	18548
Included second generation group	2	359 (2%)
Destination country		
USA	2	3198 (17%)
Canada	3	1943 (10%)
New Zealand	1	271 (1%)
Sweden	3	11285 (61%)
Netherlands	2	1264 (7%)
Israel	1	587 (3%)
Reason for migration		
Refugee	5	2482 (13%)
Labour migrant	9	16422 (89%)

Operationalisation of 'social mobility'

Table 4-2 summarises the methods used in the studies to assess 'social mobility'. As with the wider literature, social mobility is not a "single homogenous phenomenon, but rather…a cluster of interdependent social processes"[156]. The studies reviewed here attested to this complexity. 'Socioeconomic position' was preferred over the more commonly used term 'socioeconomic status' by a number of commentators [238-240] as 'status' has been judged to "blur distinctions between two different aspects of socioeconomic position…actual resources…and prestige or rank-related resources" [239].

Corresponding to this, I detected a wide array of terms to characterise changes to socioeconomic position (Table 4-2). Several studies utilised prestige-based measures to assess changes in socioeconomic position. This included one study [241]which used the 'Hollingshead Index of Social Position', a measure that combines education with occupational 'rank'[242]. As discussed by Krieger and colleagues [239], 'occupational rank' for this scale was determined by the scale's founder, based on a population in New Hampshire, USA, in the 1960s and so may not have adequately captured 'rank' or status in these migrant groups at a later time in different countries.

Three Canadian studies used the Blishen Occupational Index to assess socioeconomic position [243-245]. This scale is based on 1970s data from Canada and takes into account years' education and income in the ranking of occupations[246]. Like the Hollingshead scale, assumptions that occupation 'ranks' are the same irrespective of country may be misleading. However, in one of the studies the correlation between education and 'employment prestige' was assessed in Vietnamese refugees when comparing their education with their occupation in Vietnam, prior to migration [244]. A similar correlation was found for non-migrant Canadians living in Canada, suggesting cross-cultural comparability[244] . Two studies assessed subjective appraisal of changes to status as a result of migration[247, 248]. Both studies were cross-sectional, therefore findings may have been affected by recall biases (Table 4-2).

Table 4-2: Design features of studies

Author, year	Study design, and time period. CS=cross-sectional; CO=cohort	Sampling strategy, response RS=random sampling CON=convenience sample	Method of defining ethnicity/ nativity	Demographic details	No. in sample
LABOUR MIGRANTS					
Tinghog et al 2010*	CS postal survey, 2005.	RS of a municipality in Sweden. Response rate: 47.9%	Country of birth	Finnish, Iraqi and Iranian migrants living in Sweden, aged 20-75 and resident for >three years. 53% female	Total: 720; Finnish:211; Iranian: 250; Iraqi: 259
Nicklett & Burgard, 2009	CS. 2002-2003.	RS Weighted response rates: 75.5% (Latino sample), 65.6% (Asian sample).	Not given in paper	Migrants from Puerto Rico, Cuba, Mexico, and 'other Latinos'; people from China, Vietnam, Philippines and 'other Asian' countries to USA. 1411 males, 1645 females	1518 Latino respondents 1538 Asian respondents

Author, year	Study design, and time period. CS=cross-sectional; CO=cohort	Sampling strategy, response RS=random sampling CON=convenience sample	Method of defining ethnicity/ nativity	Demographic details	No. in sample
Tinghog et al 2007	CS: 1998-2000	RS Response rate: 53%	Country of birth	Migrants to Sweden: Swedish-born, "Scandinavian-born" (Finland, Norway, Iceland, Denmark), European-born, & "born outside of Europe"; Age: 20-65. % male: Swedish-44.5%; Scandinavian-born-34.2%; Europe-born- 44.5%; Born outside Europe-49.5%	Total: 10441; Sweden-born: 9314 Scandinavian-born: 295 ; Europe-born: 335 ; Born outside Europe/Scandinavian regions: 479
Van Oort et al, 2007	CO: 10 yr follow up Migrants: 1993-2003*	RS Baseline response: Turkish children 71% Dutch children 80% Response at follow-up: Turkish adults: 51%* Dutch adults: 58%;	Turkish children who had to have at least one parent born in Turkey.	Migrant Turkish children (74%) and second generation Turkish children (26%) growing up in Netherlands. % Boys: 50% (Turkish) 46% (Dutch)	217 Turkish respondents, 753 Dutch respondents

Author, year	Study design, and time period. CS=cross-sectional; CO=cohort	Sampling strategy, response RS=random sampling CON=convenience sample	Method of defining ethnicity/ nativity	Demographic details	No. in sample
	Dutch: 1987-1997* *Baseline assessment at 11-18yrs; follow-up assessment at 21-28 yrs.	*Larger proportion of Turkish children lost through out-migration			
Abbott et al, 1999	CS 1995.	CON Response rate: 45%.	Not given	Migrants to New Zealand. 90% from Hong Kong & Taiwan, smaller proportion from China, Malaysia, Singapore & Macau. 1%- asylum seekers or refugees. Mean age: 39 % female: 67%	271

Author, year	Study design, and time period. CS=cross-sectional; CO=cohort	Sampling strategy, response RS=random sampling CON=convenience sample	Method of defining ethnicity/ nativity	Demographic details	No. in sample
Aycan & Berry, 1996	CS, year not given	CON+ RS: 100 Individuals selected from Turkish cafes, restaurants and clubs; 150 individuals randomly selected from membership lists of Turkish organisations. Response rate: 46.8%	Not given	Turkish migrants to Canada, unclear generational status. 53.2% held Canadian citizenship. Mean age 38.2 (SD: 10.6). % male: 88%	110
Inclan, 1983	CS, Year not given	Sampling methodology and response rates not given.	Women with Puerto Rican parents who and primarily raised in USA or migrated to USA before completing first	Married second generation Puerto Rican women in USA. Age range: 18-59	142

Author, year	Study design, and time period. CS=cross-sectional; CO=cohort	Sampling strategy, response RS=random sampling CON=convenience sample	Method of defining ethnicity/ nativity	Demographic details	No. in sample
			grade of school.		
Eaton & Lasry, 1978	CS, year not given	RS. Response rates-not given.	Not given	Jewish migrants from North Africa to Canada. Only employed men interviewed.	166
REFUGEE OR ASYLUM SEEKERS					
Lindencrona et al 2008	CS: 2002-2004	CON. Response rates not given.	Not given	New arrivals from Middle East at a refugee resettlement programme, in Sweden. % born in Iraq: 83% . Mean age: 34 %male: 67%	124
Lerner et al 2005	Two CS:1990, 1994/1995	RS . Response rates-not given	Not given	Migrants from Former Soviet Union to Israel. (In 1995 sample) %male: 44%, Age: 24% above pension age.	587

Author, year	Study design, and time period. CS=cross-sectional; CO=cohort	Sampling strategy, response RS=random sampling CON=convenience sample	Method of defining ethnicity/ nativity	Demographic details	No. in sample
Laban et al 2005	CS: 1999 & 2000	RS: Two groups: New arrivals + asylum seekers living in the Netherlands on one day in 1999. Response rate: (New arrivals) 82%; Response rate: (Living in Netherlands for at least 2 years) 79%.	Not given	Iraqi asylum seekers to Netherlands Age: 'New arrivals'- 18-24 (22%), 25-24 (42%), 35-44 (15%), 45-64 (14%), 64+ (8%). 'Lived in Netherlands> 2 years': 18-24 (9%), 25-34 (49%), 35-44 (26%), 45-64 (13%), 64+ (3%) Gender (% male): 'New arrivals': 49.7% 'Living in Holland>2 years':78.8%	New arrivals: 143 Living in Holland for > 2 years: 151 (Total: 294)
Beiser et al, 1993	CO: Baseline: 1981, with follow-up at 2 yrs	RS . Response rates: Refugees-Baseline (T1)- 92% ;Follow-up (T2): 87% of baseline sample. Canadians (T2)- 81%	Not given	Chinese and refugees from Laos, Vietnam, Cambodia to Canada. Age: 5% of sample >55 years, most (75%) <35 yrs.; %male: 56%. Non-migrant Canadians interviewed at follow-up, age and gender-matched	At baseline 1348 refugees. 319 non-migrant Canadians included at T2 follow-up for comparison.

Key: **these studies may have included refugees/ asylum seekers; CS:cross-sectional, Co:cohort; RS:random sample; CON:convenience sample*

Operationalisation of 'underemployment'

'Downward mobility' may be thought of as a decline in socioeconomic position over time. Several studies also assessed the related concept of 'underemployment', whereby people are employed below their level of skill, prior expertise, or training. Although notions of 'downward mobility' and 'underemployment' clearly overlap there are also differences, insofar as people may be 'upwardly mobile' with respect to their income and the living standards that this affords them, but may at the same time have accepted employment at a level below their skill-set or education.

For example, in one cross-sectional analysis which assessed changes to income and occupational status in migrants from Turkey to Canada [243] whereas 'income' in absolute and relative terms was reported as having improved with time, respondents reported ongoing occupational decline, associated with adverse psychological health [243]. This study examined the 'financial ease' afforded by monthly incomes, by asking respondents to compare the ease in which they felt their monthly incomes allowed them to participate in certain activities in Turkey compared to Canada [243]. This measure taps into notions of 'wealth' as well as income[240], highlighting the distinction between the two concepts, where income represents material resources at a fixed time-point whereas 'wealth' represents an accumulation of assets [240]. The findings suggested that while participants experienced high levels of downward mobility and underemployment (associated with adverse mental health) in migrating to Canada, income in terms of 'financial ease' improved [243]. Conclusions are limited by this study's cross-sectional design; 'time' in this study was assessed according to participant recall of experiences since arrival in Canada.

In two studies from Sweden [249, 250] 'status incongruence' was considered present in blue collar, unemployed [250] or 'currently studying' [249] migrants who had education >12 years [250] or to university level [249]. Other investigators assessed 'underemployment' by directly asking respondents if they thought they were employed in occupations below their level of expertise [243].

Assessment of quality

Table 4-2 also summarises design and quality of included studies. Response rates ranged from 45% to 82% (Table 4-2). Of the types of study design retrieved, only two utilised a longitudinal study design, while the rest employed a cross-sectional design. No case-control studies were identified. Three of the studies used convenience sampling (Table 4-2). Sample sizes ranged from 110 people up to 10,441 people (Table 4-2). Few studies considered *a priori* confounders or interactions in the association of social mobility with common mental disorders. Indeed, in the majority of studies, an examination of the association of social mobility with common mental disorders in migrant groups was not the primary objective. None of the studies assessed mental health prior to migration. A variety of instruments were employed across studies to assess common mental disorders. Two studies utilised screening instruments which had been validated in the cultural context of the migrant group [244, 251].

Differential attrition due to return migration whereby migrants with health problems return to their country of origin, may have been an additional source of bias in some studies[76]. For example, one longitudinal study, did not find an association between underemployment and common mental disorders in Vietnamese refugees to Canada, although people lost to follow-up were more likely to be male, depressed and unmarried [244]. In the other longitudinal study there was a higher attrition rate amongst Turkish respondents compared to non-migrant Dutch respondents [252], although as this was a study of second generation Turkish children attrition through return migration should not have been an issue . In most of the studies the method to define ethnicity or nativity was conspicuously absent. Where this was present this was always determined through country of birth [241, 249, 250, 252].

Main results from the systematic review

Table 4-3 summarises the research question and reported findings for each of the reviewed studies.

Table 4-3: Summary of findings

Author, year	Measure for social mobility	Instrument to assess common mental disorders	Study question/ reference group	% Mobile + direction	Findings, confounders and potential interactions
LABOUR MIGRANTS					
Tinghog et al 2010	'Status incongruence': People of university education, unemployed or studying at time of assessment	Hopkins Symptom Checklist	What is the association of status incongruence and CMD in migrants?	N (%) with 'high status incongruence' Finnish: 8 (3.8%); Iranian: 52 (20.9%); Iraqi: 30 (12%)	% CMD in 'high' status incongruence vs. low/ intermediate status incongruence: Finnish-born: 0 vs. 12.1; Iranian-born: 63.3 vs. 46.5; Iraqi-born: 62.7 vs. 60.0 Adjusted OR (95% CI) of high status incongruence with CMD (full sample) 1.27 (0.60, 2.72)
Nicklett, Burgard 2009	Net movement on 10 point scale of 'subjective social status' (MacArthur ladder) comparing perceived status in USA with status in country of origin.	Composite International Diagnostic Interview (CIDI) for Major Depression	What is the association of social mobility in Latino or Asian migrants to USA with depression, when compared to migrants who report no change to social status?	(Unweighted N, Weighted %): Stable: 549 (17%), 1 step down: 464, (15%); 2 steps down: 420, (14%); 3+ steps down: 749, (23%)	Association* of changes to social status and major depression: [OR (95% CI)] No change: 1.00 [ref] 1 step down: 1.79 (0.83, 3.86) 2 steps down:1.94 (0.95, 3.94) 3 steps down: 2.97 (1.33, 6.61) 1 step up: 1.51 (0.53, 4.26)

Author, year	Measure for social mobility	Instrument to assess common mental disorders	Study question/ reference group	% Mobile + direction	Findings, confounders and potential interactions
				1 step up: 261 (10%) 2 steps up: 267 (11%) 3+ steps up: 346; (10%)	2 steps up: 1.10 (0.33, 3.73) 3+ steps up: 1.50 (0.49, 4.61) *Taking into account survey weights, adjusted for: social status in country of origin, ethnicity, gender, age, education, duration of residence in US, citizenship, English fluency, importance of finding employment in USA.
Van Oort et al 2007	Comparison of parental occupational class with cohort member's occupational class in adulthood.	Dutch Youth Self Report questionnaire at age 11-18 for internalising/externalising behaviours (childhood). Young Adult Self-Report & Adult Self-Report questionnaires (adulthood).	Does upward intergenerational mobility lead to improvements in mental health and does this differ by ethnic group?	56% of second generation Turkish young adults had moved into a higher socioeconomic position than their parents, compared to 43% of Dutch young adults (p=0.0007)	1. Upwardly mobile individuals experienced improvements in mental disorders over time. 2. The association of intergenerational mobility with mental health did not differ in Turkish compared to Dutch cohort members.

Author, year	Measure for social mobility	Instrument to assess common mental disorders	Study question/ reference group	% Mobile + direction	Findings, confounders and potential interactions
Tinghog et al 2007	'Status incongruence': People who were unemployed or blue collar with>12 years education	10-item Major Depression Inventory	What is the association of 'status incongruence' with depression in migrants?	% Blue collar or unemployed people with 'status incongruence': Swedish (not migrant): 78 (4%); Scandinavian migrant: 5 (7%); Other European migrant: 10 (13%); Migrants from outside of Europe: 25 (13%)	Proportions screening positive for depression (in people with 'status incongruence' vs. no status incongruence): 1. Swedish non-migrant: 5/79 (6%) vs. 193/1515 (11%) ; 2. Scandinavian migrant: 0/5 (0%) vs. 5/60 (7%) ; 3. Other European migrant: 3/10 (30%) vs. 12/63 (19%) ; 4. Migrants from outside Europe: 7/25 (28%) vs. 38/154 (25%) No adjustment for confounders.
Abbott et al, 1999	Proportion employed in 'business/ professions' pre-migration, but not at this level post-migration.	12-item Chinese Health Questionnaire	In a migrant sample what is the association of underemployment with CMD compared to people reaching occupational	45% (271) reported being employed in business or professions prior to migration, 18% employed at this level post-migration.	In recent migrants (<2 years), under-employment post migration was associated with mean CHQ=12.8; SD=1.7 compared to those reaching occupational parity (mean CHQ=4.6; SD=2.7) p<0.001. No difference in mean CHQ scores in people resident for >2 years. No adjustment for

Author, year	Measure for social mobility	Instrument to assess common mental disorders	Study question/ reference group	% Mobile + direction	Findings, confounders and potential interactions
			parity?		confounders
Aycan & Berry 1996	'Status' assessed using income, education and occupation. 'Status loss': assessed change in status in Canada as compared to reported status in Turkey	SEM used to assess 'psychological health' latent variable. Manifest variables were: 'acculturative stress' (20-item scale for somatic and psychological items), 9-item 'self concept' scale, 13-item 'alienation' scale	What is the association of status loss, mobility and underemployment on common mental disorders in Turkish migrants to Canada?	Significant decline in mean SEP, comparing Turkey to Canada ($p<0.001$)	SEM to assess latent variables 'employment-related experiences' (manifest variables: duration of unemployment, status mobility, status loss, employment status) and its associations with latent variable 'poor psychological health'. Coefficient for association of employment-related experiences and poor psychological health was -0.60, $p<0.01$. Fit of model: GFI: 0.93, RMSEA: 0.06; CFI: 0.95
Inclan 1983	Hollingshead social status scale to determine SEP. Current SEP compared to (reported) parental SEP assessed.	Symptom Checklist - 90 (SCL-90) (revised) scale.	What is the association of intergenerational mobility with common mental disorders in second generation Puerto Rican	Intergenerational mobility: Socioeconomic position (grouped as either 'low' SEP and 'middle' SEP) between two time	Women who were 'low' SEP at both time points had higher mean psychological scores than women who remained middle SEP at both time points or women who were upwardly mobile ($p<0.05$)

Author, year	Measure for social mobility	Instrument to assess common mental disorders	Study question/ reference group	% Mobile + direction	Findings, confounders and potential interactions
			women living in America?	points (i.e. birth & adulthood)- Low-low SEP group: 49 (34%); Low-middle SEP: 61 (42%); Middle-middle SEP: 32(23%) No women moved from Middle-low SEP	No adjustment for confounders
Eaton & Lasry, 1978	Blishen scale to assess occupation rank. 'Occupational mobility': Difference in score for present job and pre-migration job.	'Mental health' determined by the Langner scale	What is the association of social mobility with common mental disorders in employed migrants from North Africa to Canada?	Variance for the mobility score was: 94.9 (range: -37.1 to +25.2) suggesting extreme upward + downward mobility within the sample	1. Association of (upward) occupational mobility with mental health score, after adjusting for present job and education was r=0.12 p=ns; after adjusting for present job only was r=0.20 p<0.01. 2. Partial correlation of (upward) occupational mobility with mental health score in those employed>2 years was r=0.30 p=0.02; in those

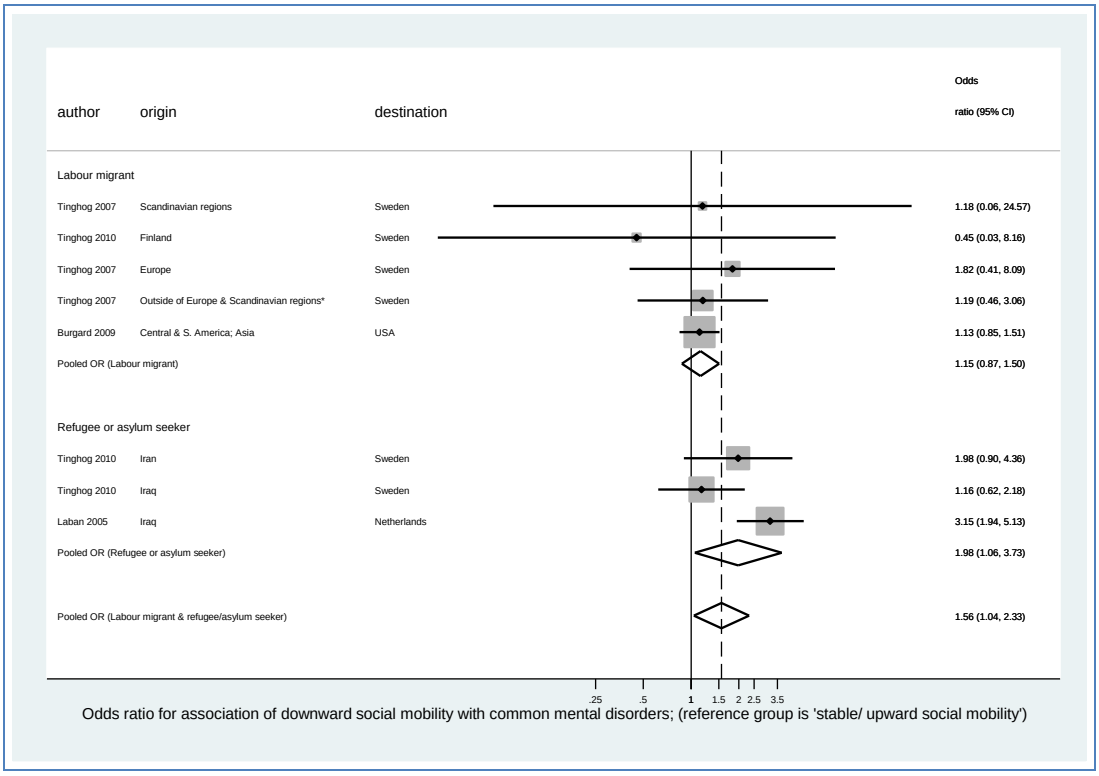
Author, year	Measure for social mobility	Instrument to assess common mental disorders	Study question/ reference group	% Mobile + direction	Findings, confounders and potential interactions
					employed<1 year: r=0.55 p=0.01.
ASYLUM SEEKERS AND REFUGEES					
Lindencrona et al 2008	Respondents asked 'Have you experienced lost respect and status?' assessed on 5 point scale	General Health Questionnaire-12 (GHQ-12)	Is lost respect and status associated with CMD in a group of refugees from the Middle East to Sweden?	Mean (SD): Lost roles in society: 2.3 (1.6) Lost respect and status: 0.54 (0.95) Lost roles at home: 1.4 (1.6)	'Lost respect and status' loaded on to an underlying 'discrimination and status loss' construct. Zero-order correlations between discrimination and status loss and GHQ scores was 0.29 p<0.01,
Lerner et al 2005	10-point hierarchical scale of occupation. Difference in employment status comparing pre to post-migration.	Psychiatric Epidemiologic Research Interview, de-moralisation subscale (PERI-D): measure for common mental disorders in populations	What is the association of 'change in employment-status' as a result of migration with common mental disorders?	%downwardly mobile: males: 42.9%; females 58.7%	Downward mobility not associated with a decrease in PERI-D scores. No adjustment for confounders. Analyses stratified by gender
Laban et al 2005	'Work below level' – method of	Composite International	What is the association of	'Work below level' in 22.7% of asylum	1. On all mental disorder outcomes % who were 'working below level' higher

Author, year	Measure for social mobility	Instrument to assess common mental disorders	Study question/ reference group	% Mobile + direction	Findings, confounders and potential interactions
	determining this not given in paper	Diagnostic Interview (CIDI)	'working below level' with common mental disorders in asylum seekers to the Netherlands?	seekers who had migrated in last yr; & 44.9% of asylum seekers who had lived in Netherlands for at least two years	than those who didn't have a disorder 2. Association of 'work below level' and 'one or more psychiatric disorders exc. PTSD': OR 1.37 (95% CI: 1.11, 1.69) (adjusted for gender, family issues, uncertainty over asylum status)
Beiser et al, 1993	'Status discrepancy' determined by using Blishen scale to assess occupation, taking into account previous education (both migrants and refugees) or prior job (refugees only).	Symptom inventory from Centre for Epidemiological Studies-Depression scale (CES-D), Senegal Health Scales, Self-Reporting Questionnaire (SRQ), Diagnostic Interview Schedule (DIS). Items from Vietnamese Depression Scale.	What is the association of underemployment with depression in refugees to Canada and in non-migrant Canadians?	Full sample of refugees were downwardly mobile. Greatest downward mobility was experienced by the most educated refugees.	1. No association of under-employment with depression in refugees; regression coefficient, r=-0.03 p=non significant at first time point, r=0.00 at second time point 2. In Canadians: correlation between status discrepancy scores and depression was r=0.32 (p<0.001)

Downward mobility, common mental disorders and migration

Random effects meta-analysis suggested that the (pooled) association of downward social mobility with common mental disorders, relative to stable/ or upward mobility was 1.56 (95% CI: 1.04, 2.33), in people who had migrated (Figure 4-3). An I^2 of 52%(X^2_7=14.6 p=0.042) suggested moderate heterogeneity, such that the association of downward social mobility with common mental disorders varied between groups. This was visually confirmed in the forest plot (Figure 4-3)

Figure 4-3: Association of downward social mobility with common mental disorders in international migrants; random effects meta-analysis



***Key**: *also included some refugee/ asylum-seeker groups; Grey boxes represent individual study estimates (box size is proportional to the weight given in random effects meta-analysis); Diamonds represent pooled summary estimates; Broken line represents overall summary estimate*

There was moderate heterogeneity between studies assessing refugee/ asylum-seeker groups (p=0.05; I^2 67%) which was negligible for studies assessing labour migrants (p=0.94; I^2 0.0%). There was a high level of heterogeneity between studies which had assessed social mobility by self-report measures (p<0.001; I^2 90.1%), whereas negligible heterogeneity between studies assessing social mobility using 'objective' measures such as changes to employment (p=0.86; I^2 0.0%). There was moderate heterogeneity between studies of people who had migrated from outside Europe/ Scandinavian regions (p=0.008; I^2 71.2%) which was negligible in studies of migrants from these regions (p=0.70; I^2 0.0%).

Results of meta-regression are shown in Table 4-4. 95% CIs spanned the null for each potential source of heterogeneity. The residual variance due to heterogeneity was reduced to 0% (with 100% of between-study variance accounted for), when all meta-regression covariates were entered into the model. 'Reason for migration' (refugee/ asylum seeker versus labour migrant) accounted for the largest proportion of the variance (Table 4-4).

Table 4-4: Meta-regression of study characteristics predicting common mental disorders

Study characteristics		**β (slope coefficient) (95% CI)**
Response rates	>60%	REF
	<60%	1.32 (0.44, 3.92)
Method for determining social mobility	Pre-migration SEP compared to post-migration SEP by investigator	REF
	Participant self-reported changes to social status following migration	1.32 (0.44, 3.91)
Reason for migration	Labour migrant	REF
	Refugee or asylum seeker	1.73 (0.72, 4.16)
Destination	Europe/ Scandinavian regions	REF
	USA	0.65 (0.21, 1.98)
Region of origin	Europe or Scandinavian regions	REF
	Outside Europe/ Scandinavian regions	1.24 (0.22, 7.07)

Studies assessing common mental disorders as a continuous measure

A narrative synthesis of findings from studies not subjected to meta-analysis is presented here.

In one study of migrants to Canada there was an association of subjective status loss and downward mobility with a latent construct of poorer 'psychological health'[243]. In another study of refugees from the Middle East to Sweden, subjectively perceived 'loss of status' loaded with 'reported discrimination' on to an underlying construct which was associated with elevated mean GHQ scores[248]. A cross-sectional study assessing mental health in Chinese migrants to New Zealand[251] suggested that underemployment was associated with greater psychological morbidity in recent migrants (<2 years), compared to people settled for longer [251].

Conversely, two studies did not find associations between downward mobility and psychological morbidity, despite downward mobility being a relatively frequent occurrence amongst the migrant groups in the studies. This included a study of depression in Vietnamese refugees to Canada [244], and a study of migrants from the Former Soviet Union to Israel[253][39]. Only one study suggested that being upwardly mobile was associated with greater psychological morbidity [245]. This was the oldest study (from 1978) and assessed a group of employed men who had migrated from North Africa to Canada.

Studies in second generation groups

Only two studies assessed intergenerational social mobility in second generation groups[241, 252]. In both studies upward intergenerational social mobility was associated with improvements in mental health [241, 252]. The study of second generation Turkish adults living in the Netherlands, was a good quality study (Table 4-2) which employed a longitudinal design. This study did not find a differential

[39] Although in the latter case the migration may have been linked to ideological or religious reasons which may have played a protective role for mental health

association of social mobility with common mental disorders in the Turkish group compared to Dutch adults, although Turkish adults were more likely to experience upward intergenerational social mobility across their life-course than Dutch adults [252].

Discussion

Key findings of the systematic review

In keeping with the broader literature [53, 54, 222-224], migrants tend to experience downward mobility and underemployment. This review revealed a paucity of research examining this as a possible factor in understanding the mental health and wellbeing of migrants, with a more striking absence of research examining this linkage among second generation groups, for whom employment and social mobility is different to the majority population[53, 54].

Meta-analysis suggested that international migrants who experienced downward social mobility as a result of migration were more likely to screen positive for common mental disorders than migrants who retained a stable socioeconomic position or who were upwardly mobile (Crude OR: 1.56; 95% CI: 1.04, 2.33). This was despite the inclusion in this estimate of groups migrating from within Europe which would have included skilled migrants moving to relatively well paid jobs.

Meta-regression suggested a larger association in refugee/ asylum seeker groups than in labour migrants, although the strength of the evidence for a difference was weak. Conclusions were limited by the small number of studies retrieved. There were conflicting results from three studies which did not support an association of downward mobility or underemployment with psychological morbidity [244, 245, 253].

The widely divergent international migratory contexts, as well as the design and quality of the studies, accounted for the observed heterogeneity. In addition, the variety of ways in which social mobility has come to be operationalised within the literature added a further tier of complexity in attempting to synthesise results.

Literature review limitations

It was not possible to assess gender differences across studies, as frequently studies did not present results which allowed analysis by gender. The reasons for migration and patterns of work taken may have marked differences for men and women; the "feminisation of migration" has been noted as a more recent shift [218]. The effects on

downstream adult common mental disorders also vary by gender and life-course social mobility[254]. This should be investigated in future work.

I was unable to locate literature examining migration from all geographical regions. For example, there was a conspicuous absence of studies examining migration within Africa or from South Asia. Only one study was located, examining migration from the Former Soviet Union and no studies examining migration from other parts of Eastern Europe were found. This might impact on the generalisability of the findings. In addition, there were no studies identified which examined these processes in Irish or Irish-descended people- the group forming the focus of this thesis. The paucity of studies examining second generation ethnic minority groups was also disappointing.

The scarcity of studies retrieved meant that it was not possible to assess for publication biases using funnel plots. A concern is that smaller studies showing positive associations may have been more likely to be published and therefore included in this review. I attempted to address this by locating 'grey literature', however contact with known experts in the field and first authors did not reveal additional papers.

A final issue relates to the assessment of 'common mental disorders' across cultures. An assumption underpinning this systematic review is that this was assessed in a consistent manner across all studies. I minimised problems with low reliability by including only studies which employed structured assessments. However, it may be that the heterogeneity observed across some of the studies was due to the way in which 'common mental disorders' was conceptualised in each of the studies.

Relationship of the systematic review findings to literature on Irish migration and health

It is important to highlight potential similarities and differences between the study populations included in this systematic review, and the study population which will be used as the basis for analysis, in this thesis.

As discussed in Chapter 2, much migration from Ireland to Britain in the immediate post-war boom years was boosted by a relative shortage of labour in the construction

industries as well as in health, personal and domestic sectors in Britain[16]. Research examining nationally representative data, has suggested that Irish-born migrants born between the years 1920 to 1960 were of poorer health than both Irish-born people in Ireland and English-born people in England, born in equivalent years[74]. In addition, their data indicates that this group of people were shorter in height and had fewer years' education, than the Irish-born remaining in Ireland and English-born in England[74]. The latter finding would suggest that Irish-born migrants born over the period 1920-1960 were more likely to have experienced greater disadvantage in their own childhoods, relative to Irish-born people who remained behind in Ireland and English-born people in England. If this is the case, then it is less likely that the Irish-born parents of cohort members in the present study would have experienced downward social mobility on migration to Britain, and perhaps more likely that they moved from one disadvantaged context to another. Unfortunately the cohorts used for the analysis in this thesis do not allow a detailed exploration of circumstances which Irish-born parents would have experienced pre-migration (see later in this thesis for a fuller discussion of this limitation).

A further difference between the study populations represented in this review, compared to the population which will be used for my analysis, is the large proportion of migrants who were of refugee or asylum-seeker status. It would seem likely then, that if downward social mobility was experienced by Irish-born migrants (i.e. by the parents of cohort members), and if the findings of the meta-analysis could be applied to this group, in fact the association with common mental disorders would be altogether more modest than the size of the overall estimate which was found through meta-analysis of all studies (Figure 2-1).

There are relatively few studies which examined social mobility and common mental disorders in second generation ethnic minority groups. Of the two studies of second generation ethnic minority groups which were reviewed in this chapter [241, 252], both suggested that second generation ethnic minority groups experienced a greater degree of intergenerational upward social mobility, and that this was protective for common mental disorders. The study by Inclan suggested that an accumulation model of

disadvantage (as discussed in Chapter 3) might best account for later-life downstream common mental disorders[241]; i.e. upward intergenerational social mobility mitigates against the risk of later-life common mental disorders as it reduces individuals' exposure to adversity over the life-course. These observations may be relevant to the present study population, in attempting to understand how life-course disadvantage, and in particular changes to this, may impact on later adult mental health.

Finally, the lack of studies examining second generation ethnic minority groups, would suggest a major gap in the literature which the findings from this thesis may help to address.

Conclusions

The findings from this systematic review and meta-analysis indicate that as part of the process of migration and settlement, migrant groups do experience significant changes to their socioeconomic position which may have a negative impact on later mental health. The impact on mental health may be greatest where downward social mobility has been experienced on migration, or an 'occupational penalty' has been paid by the migrant. In addition, of the few studies reviewed here, it would seem that second generation ethnic minority groups experience high levels of upward intergenerational social mobility, and that moving out of disadvantage may have beneficial effects for mental health in later years, for this group.

Although I highlighted in the previous section that Irish-born migrants to Britain (i.e. the Irish-born parents of second generation Irish cohort members, who will form the basis for analysis in this thesis) may not have necessarily experienced downward social mobility on arrival to Britain, the literature reviewed in previous chapters has highlighted the importance of social disadvantage, (for example in the form of lower socioeconomic position or unemployment) as increasing the risk for depression[79] and poorer health[11] in Irish-born migrants. Taken together with the literature reviewed in Chapter 3, it would appear that an analysis of the impact of social disadvantage over the life-course in second generation Irish people must take account of changes to social circumstances over the life-course as well as the possibility that exposure to earlier (or

‘distal’) adverse effects may continue to exert long-range effects on down-stream adult health outcomes, albeit potentially mitigated by later processes such as upward intergenerational mobility.

Summary points

1. Few studies have examined the association of social mobility with common mental disorders in migrant and second generation groups. In this chapter I summarised all previous work, using systematic searches and meta-analysis.

2. Downward social mobility was a frequent consequence of international migration in reviewed studies.

3. Using random effects meta-analysis, migrants (which included refugees and asylum seekers as well as labour migrants) who were downwardly mobile were more likely to have a common mental disorder (Pooled OR: 1.56; 95% CI: 1.04, 2.33), than those who retained pre-migratory socioeconomic position or status, or who were upwardly mobile. This association was modest when considering labour migrants only (OR: 1.15; 95% CI: 0.87, 1.50).

4. Very few studies included second generation groups. The paucity and quality of studies retrieved constrained further interpretation.

5. The findings in this chapter, taken together with the evidence presented in the previous chapter, suggest the importance of examining changes in exposure to social disadvantage over the life-course in migrant and second generation ethnic minority groups, as it is apparent that this is not a static process, and may have effects on later health outcomes (including but not limited to adult mental health).

5 Thesis overview and objectives

In Chapter 2 I detailed an extensive literature on health inequalities in Irish people living in Britain. In Chapter 3 I explored aetiological mechanisms for psychological health, self-rated health and health-related behaviours, within a life-course framework. In the previous chapter I focused specifically on social mobility, and common mental disorders in first generation migrants and second generation ethnic minorities.

A number of gaps in the literature were identified, which I will attempt to address through the research described in this thesis, using a life-course informed perspective. In this chapter, I first discuss potential 'mechanisms' through which health inequalities may transfer from first to second generation Irish people. In the second part of this chapter, I will discuss overall study aims and objectives and the way in which these mechanisms will be further explored in the datasets.

Bringing a life-course informed perspective to understanding health inequalities in Irish people: gaps in the literature

In Chapter 2 the background literature on Irish health disadvantage was reviewed. Much of this literature has focussed on adult determinants of health in accounting for the persistent health disadvantages noted in Irish-descended people living in Britain. The main causal factors examined or discussed in previous accounts of Irish health disadvantage have broadly related to; migration-related 'selection' effects; risk factors relating to the pre-migration context, such as preparedness for migration or experiences of childhood abuse; risk factors relating to the post-migration settlement context, such as social support and community contexts; and factors relating to the adoption of, or loss of, health-damaging/ health-protective behaviours after migration to Britain. Most of this literature has focused on the first generation, therefore a notable gap in the literature is research linking the health of the first generation to the second. Social disadvantage has also been extensively considered[1], but research in this area has tended to focus on measures of socioeconomic position taken at single points in time,

usually in adulthood. Where the effects of social class or related indices have been considered, these have not fully accounted for observed health-related differences in second generation Irish people, although may account for some of the observed health inequalities in the first generation[1, 47]. The following section will discuss potential mechanisms which might account more specifically for health inequalities in second generation Irish people living in Britain.

Parental health

There is an extensive literature on the marked physical and mental health inequalities experienced by Irish-born people living in Britain (Chapter 2). Although one may presume that Irish-born people who went on to form families may have represented a sub-set of people with 'better' health (I have already discussed in Chapter 2 the role of marriage and other forms of social support in protecting against mortality[67] and psychiatric morbidity[79] in Irish-born people), one mechanism through which poorer health may be 'transmitted' across a generation may be through parental health. There is much evidence in support of this from the broader literature. For example, parental mental and physical health problems are known to be associated with emotional and psychological problems in children, through processes such as disrupted parenting [255, 256]. In addition, parental health-related behaviours such as tobacco use and alcohol use are also known to strongly associate with health-related behaviours in the next generation [257]. Therefore, given the extensive literature on health inequalities in first generation or Irish-born people, one mechanism which should be considered as a possible factor in the poorer health of the second generation may be via parental health[40]. However, this has not been given much consideration previously in the literature.

Childhood adversity

The direct role of childhood disadvantage in accounting for adult health disadvantages in Irish people has been considered in only a handful of studies (Chapter 2). Previous

[40] This was also suggested to me by Dr Mary Tilki, Chair of the Federation of Irish Societies in Britain

assessments of childhood adversity in accounting for later adult health have been limited to:

1. The role of systematic childhood abuse and trauma in institutional settings as contributing to later adult mental health problems, as well as influencing later decisions to migrate, highlighted in previous qualitative work[45, 95];

2. A consideration of a (limited) range of recalled childhood SEP indicators (including father's social class, age at leaving education, cumulative social class and number of siblings) in partially accounting for the excess mortality noted in third or fourth generation Irish-descended people living in Scotland [11];

3. Some evidence of experiences of childhood adversity (as assessed through height and education) in Irish-born people who migrated to Britain both compared to people in the receiving country (England) and compared to people who did not migrate from the sending country (Ireland), suggesting 'selection effects' which might account for the health disadvantages previously observed in Irish-born people living in Britain [74].

The broader literature around life-course influences for adult health, as reviewed in Chapter 3, supports an important role of childhood disadvantage in accounting for a number of downstream adult health outcomes; from mortality and self-rated health to common mental disorders and health-related behaviours in adulthood. In this work, 'disadvantage' in childhood has been assessed through diverse indicators, ranging from childhood socioeconomic position (usually parental or father's social class), to childhood trauma (e.g. physical and/ or sexual abuse and family disruptions). Putative models linking childhood adversity to later health have included 'sensitive periods'/ 'social origins' models, 'pathway' models and 'accumulation of risk' models. Yet there has been little discussion of how these theoretical models may be relevant to the health of second generation Irish people living in Britain. The relative 'non-specificity' of childhood disadvantage in predisposing to a variety of adverse downstream health outcomes could be of major public health importance especially as,

"The identification of common pathways has substantial public health relevance for the translation of life course epidemiology into practice; this is because interventions that target common pathways have the potential to reduce morbidity related to multiple conditions." [258]

There is therefore a need for a detailed enquiry into childhood circumstances experienced by second generation Irish people growing up in Britain, and the way in which childhood disadvantage might account for a range of downstream adult health outcomes, such as self-rated health, common mental disorders and health-related behaviours. The 'non-specificity' of childhood disadvantage in leading to poorer health later in the life-course may have relevance to other migrant groups settling in Britain, as childhood poverty continues to be a feature characterising settlement for many new migrant groups arriving in Britain today[259].

Material and social adversity over the life-course

In Chapter 2, I discussed the literature around intergenerational social mobility in second generation Irish people. Despite some evidence to indicate that Irish-descended people continue to live in relative deprivation in some parts of Britain [90], there is also evidence to indicate that second generation Irish people experience higher rates of upward social mobility compared to the general population, and also, compared to Irish-born migrants [52, 54, 55]. In Chapter 4 I reviewed and discussed the evidence relating to social mobility and common mental disorders in other first and second generation migrant groups. Each of the two studies identified that included second generation ethnic minorities appeared to suggest that upward social mobility was protective for later adult common mental disorders [36].

In the previous section I highlighted the role that childhood adversity may play in accounting for poorer health in second generation Irish people. A related enquiry of interest is how far these experiences continue or 'track' into adulthood, and how far these account for observed health inequalities in adulthood, relative to childhood. As suggested by the literature review on social mobility and common mental disorders in Chapter 4, moving out of disadvantage in the later years may have a 'protective' effect

on later health outcomes, including mental health. Examining changing experiences of disadvantage over the life-course may help to better understand reasons for the paradoxically[41] poorer health and increased mortality risk previously reported in second generation Irish people.

Stressful life events and social support

In Chapter 2 I highlighted studies of Irish-born people, in which marital status and social support has been reported to either modify or mediate the risk of health outcomes, including mortality and depression [67, 79]. In the section on 'causation' of health inequalities in Chapter 3 I also discussed at length factors relating to the post-settlement context which may either protect against or exacerbate mental and/ or physical health problems[42] in Irish people. This chapter highlighted a dearth of literature around the experiences of second generation Irish people. In particular, it is unclear from the literature to date how far stressful life events and social support over the life-course mediates mid-life health inequalities and health-related behaviours such as alcohol misuse and tobacco use in second generation Irish people. The present study will allow the possibility of examining this further.

Mental health over the life-course

As discussed in Chapter 3, there is much evidence from the literature suggesting that childhood mental health shows continuities with adult mental health. Although the studies reviewed in Chapter 2 suggested that the mental health profile of Irish children

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[41] 'Paradoxical' as these health disadvantages persist, despite apparent improvements to socioeconomic position relative to prior generations

[42] As I discussed in Chapter 2, mechanisms relating to social support may be complex. For example, Tilki suggests that although the Irish public house served as a refuge for Irish-born men who were lonely, this form of social support was also associated with hazardous drinking, with deleterious consequences for health (*Tilki, 2006*). On the other hand there may be associations with living in areas of higher own group density (associated with social support, enhanced networks) which buffer against adversities that increase the risk of mental health problems (*Das-Munshi et al 2010, 2012*)

is relatively favourable in comparison with non-Irish children, the possibility that psychological morbidity in childhood may mediate later adult mental health problems will be considered in this thesis. Also childhood mental health, in particular externalising behavioural problems, are known to be associated with later tobacco use as well as alcohol misuse[260, 261], and so it would also be of interest to examine if this is a concern for second generation Irish cohort members in this study.

As discussed in Chapter 2, findings from qualitative research have suggested that Irish-born people may use alcohol as a 'coping mechanism' for pre-existing mental health problems such as depression[45, 95], although heavy alcohol use in itself may also predispose individuals to depression. Therefore it would be of interest to assess in analyses if pre-existing mental health problems (from childhood through to adulthood) account for mid-life mental health and well-being, as well as alcohol misuse and tobacco use.

Alcohol and tobacco use

There is a large and at times controversial literature around alcohol misuse and other health-related behaviours amongst Irish-born and Irish-descended people (Chapter 2). The literature reviews highlighted a relative scarcity of studies around alcohol use in second generation Irish people, with most prevalence studies focusing on Irish-born migrants (the first generation). Where second generation Irish people have been considered, the literature has tended to suggest that patterns of health-related behaviours by the second or subsequent generations approximate much closer to that of the general population in Britain. Health-related behaviours do not seem to account for some of the poorer health outcomes noted in Irish-born and Irish descended people [11, 55].

Several themes from the life-course literature on tobacco and alcohol use are potentially relevant to understanding health inequalities in second generation Irish people. First, there is a clear gap in the literature as to patterns of alcohol and tobacco use in second generation Irish people living in Britain; Specifically, the way in which these behaviours may 'track' through to adulthood. The life-course antecedents of these behaviours have not yet been systematically examined in second generation Irish

people. If there are differences in health-related behaviours in second generation Irish people relative to the rest of the population, could there be specific factors across the life-course which may predispose second generation Irish cohort members to adopt or persist with adverse health-related behaviours, relative to the rest of the cohort?

Although the potential role of health-related behaviours in mediating mortality [11] and poorer self-rated health [55]in Irish-descended people have been reported in two previous studies, the role of alcohol misuse and tobacco use in accounting for common mental disorders and poorer self-rated health in second generation Irish people has not been systematically examined in prospective data, using measures collected at earlier time-points (to avoid issues relating to reverse causality) [43]. This will also be assessed in this thesis.

Study aims

1. To assess, over the life-course, experiences of social and material inequalities in second generation Irish people growing up in Britain, relative to people born in Britain without a parental history of migration.
2. To assess the prevalence of childhood emotional and behavioural problems, adult common mental disorders, poorer self-rated health and tobacco & alcohol use in second generation Irish cohort members relative to the rest of the cohort, and how differences evolve from childhood through to mid-life (age 44/45).
3. To assess whether family settlement and parental health mediate childhood emotional and behavioural problems in second generation Irish children.
4. To assess if any experiences over the life-course mediate mid-life health disparities or health-related behaviours in second generation Irish people. Specifically, to assess if exposure to adversity broken down by *timing* (childhood, early adulthood, mid-life) of exposure and *type* of exposure

[43] Although the association of alcohol use with depression has been examined in Irish-born migrants in a case-control study (Ryan *et al*, 2006)

(material adversity, family adversity, social support, stressful life events and job stress, earlier health and health-related behaviours) mediate mid-life health outcomes.

Research objectives

(See Figure 5-1 *for a schematic representation)*

Childhood:

1. To assess the prevalence in childhood (up to age 16) of emotional and behavioural problems in second generation Irish children, relative to children without a parental history of migration.
2. To the extent to which inequalities in psychological morbidity between Irish children and the rest of the cohorts may be apparent, to assess if these may be mediated by either a) parental physical or mental health problems, or b) material hardship experienced by the family.

Although there have been a few studies examining childhood psychological health in Irish children (Chapter 2), none of these have explored possible underlying mechanisms. This is a limitation of studies examining the mental health of ethnic minority children, in general[262], and will be addressed in this thesis.

Adulthood:

3. To assess material inequalities alongside experiences of social support and stressful life events in adulthood among second generation Irish people.
4. To assess the prevalence of common mental disorders and self-rated health from early adulthood to mid-life in second generation Irish cohort members, relative to the rest of the sample
5. If second generation Irish people are more likely to screen positive for mid-life common mental disorders or poorer self-rated health, to assess the reasons for this. In particular, does material adversity experienced over the life-course mediate mid-life health inequalities, and if so are any specific points in time (childhood, early adulthood, later adulthood) more 'sensitive' to putting people

at greater ‘risk’ of later downstream health inequalities? In addition, do any of the following mediators account for mid-life common mental disorders or poorer self-rated health: childhood psychological morbidity, earlier health-related behaviours (tobacco use and alcohol misuse), earlier psychological morbidity or reports of poorer self-rated health in adulthood, stressful life events, job insecurity or social support?

6. To assess the prevalence of alcohol use (use in adolescence and reported abstinence) and misuse (hazardous use and harmful use) and tobacco use over the life-course, in second generation Irish cohort members, relative to the rest of the sample. If differences in alcohol misuse and tobacco use exist, to assess the reasons for this. Specifically do any of the following mediators account for observed inequalities in mid-life health-related behaviours in second generation Irish cohort members: Parental alcohol misuse or tobacco use in childhood, parental emotional problems in childhood, childhood material disadvantage, emotional or behavioural problems in childhood or common mental disorders in adulthood, material disadvantage in adulthood, stressful life events, social support, and job stress in adulthood.

There is a clear gap in the literature detailing adult mental health and the prevalence of health-related behaviours such as alcohol and tobacco use in second generation Irish people (Chapter 2). The objectives outlined above will address this. In addition, mediation analyses will allow an exploration of specific factors over the life-course that may mediate any inequalities in health-related behaviours observed in mid-life.

7. To assess differences in experiences over the life-course as well as health outcomes and health-related behaviours as outlined above according to gender, specifically assessing interactions by gender.

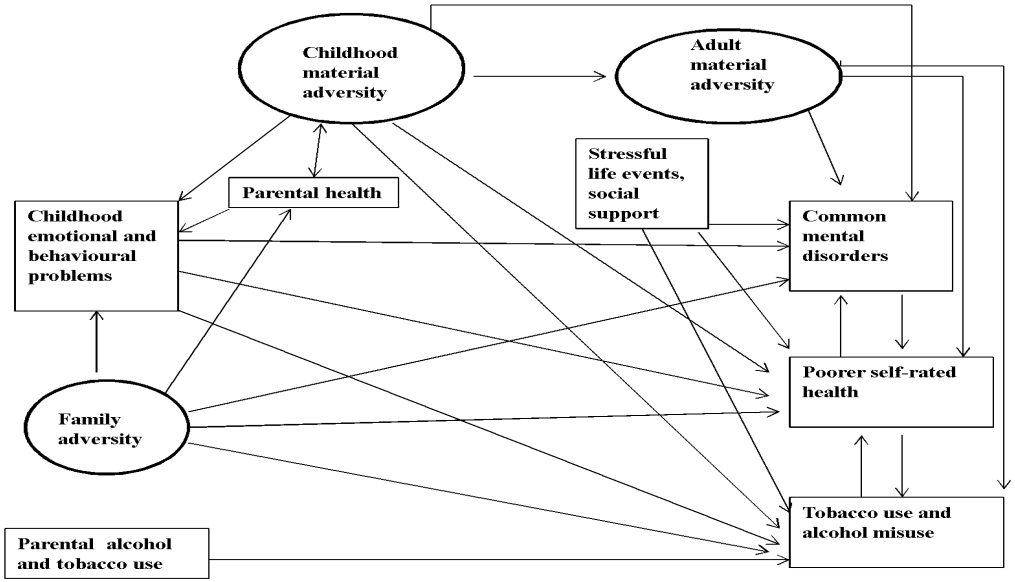

Figure 5-1: Possible pathways for health inequalities in second generation Irish people

6 Methodology

Introduction

In the following chapter I will provide an overview of the methods. Specifically, this chapter contains information relating to the datasets, psychometric properties of instruments used in the data collection stages (including information relating to the validity of instruments) and more generic concerns relating to data analysis, such as multiple imputation. Further details relating to more specific study methodology can be found in the chapters where each of the analyses is presented (Chapters 7-9).

Datasets

The datasets used for the analyses were chosen for their comparability in terms of design and scope of inquiry, and because they included a significant number of people of second generation Irish descent. Both datasets; the National Child Development Survey or 'NCDS' and the Birth Cohort Survey or 'BCS70' represented a sample of approximately 17,000 babies born in a single week in 1958 and 1970, respectively. The NCDS included all children born in England, Scotland and Wales, whereas BCS70 also included children born in Northern Ireland. In both instances, children and their parents/ carers were interviewed at several time points in childhood (including birth), and cohort members were interviewed at several time-points in adulthood. It has been suggested that the two datasets represent *"a random sample of births from the period of interest"* [263]. Particularly for BCS70, restrictions related to funding, teacher strikes and other events, have at times impacted on data-collection and achieved response rates [263]. This has meant that overall response rates have varied across time in the two cohorts; more information on this is given below.

Table 6-1 displays phases of data collection in the two cohorts, with the information on the number of respondents available to provide information at each of the sweeps. Data from ages 0, 7, 11, 16, 23, 33, 42, and 44/ 45 were used from NCDS and from ages 0, 5, 10 and 16 from BCS70 (Table 6-1).

Table 6-1: Overall response rates at each sweeps of the cohorts (NCDS and BCS70)

NCDS								**Biomedical sweep**
Sweep (age)	**0 (0)**	**1 (7)**	**2 (11)**	**3 (16)**	**4 (23)**	**5 (33)**	**6 (42)**	**(44/45)**
Year	1958	1965	1969	1974	1981	1991	2000	2002
N (% of total (n=16765*)) present in sample at each sweep	16553 (99%)	14258 (85%)	13915 (83%)	13138 (78%)	11411 (68%)	10460 (62%)	10412 (62%)	8690 (52%)
	The above figures include Irish respondents in the totals							
N (% of total (n=791)) of 2nd gen Irish respondents in sample**	782 (99%)	710 (90%)	761 (96%)	699 (88%)	544 (69%)	509 (64%)	505 (64%)	417 (53%)
BCS70								
Sweep (age)	**0 (0)**	**1 (5)**	**2 (10)**	**3 (16)**	**-**	**-**	**-**	**-**
Year	1970	1975	1980	1986	-	-	-	-
N (% of total (n=15591†)) present in sample at each sweep	14875 (95%)	11948 (77%)	13261 (85%)	10430 (67%)	-	-	-	-
	The above figures include Irish respondents in the totals							
N (% of total (n=832‡)) of 2nd gen Irish respondents in sample	832 (100%)	544 (65%)	563 (68%)	388 (47%)	-	-	-	-

***Key**:*Excludes children who migrated to Britain and were not born in England, Scotland or Wales in the index week (n=920) & children who had one or both parents born outside England, Scotland, Wales, Ireland or Northern Ireland (n=1251);**After excluding migrant children, there were 791 children who were second generation Irish within NCDS; †Excludes 626 children born in Northern Ireland, 1696 children with one/ both parents born outside England, Scotland, Wales or Northern Ireland, 822 migrant children and 366 children for whom no data was ever collected; ‡After excluding migrant children there were 832 children who were second generation Irish within NCDS; Response rates at 16 in BCS70 were adversely affected by the teacher's strike*

The table confirms that achieved response rates in BCS70 at 16 were lower than those achieved in NCDS[44] at the equivalent age. In general response rates in second generation Irish respondents were fairly similar to that of the rest of the cohort, although there is a suggestion that response rates in BCS70 may have been slightly reduced in Irish cohort members relative to non-Irish cohort members. Further details on each of the cohorts are given in the next section.

National Child Development Survey (NCDS)

The National Child Development Survey (NCDS) was started in 1958 in order to understand the social and medical factors accounting for neonatal mortality in 1958. Subsequently, follow-up waves have followed up these children resulting in multiple measures for health, social and environmental factors, across the life-course.

Parental migration history in NCDS

At sweeps two and three of the NCDS (age 11, 16), parents were asked to report their country of birth. Cohort members with either one or both parents reporting that they were born in Ireland or Northern Ireland were classified as 'second generation Irish'. In NCDS, excluding non-responders, kappa assessing the reliability of parental responses to this question between the two sweeps was high (kappa=0.97). Parents could also report if they were born outside of Britain or Ireland, however the analyses presented here are restricted to cohort members with both parents born in Britain and second generation Irish cohort members.

A proportion of respondents (n=3041) were missing information on their parents' country of birth. Broadly, children might be missing information on parental country of birth if they were either not present at either sweep when the question was asked (n=2038), or were present but did not respond to the question (n=1003). Analyses were performed to assess how far children who were missing information on parental country of birth differed from those who had this information. The results of this analysis are presented in the next chapter.

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[44] This phase of data collection in BCS70 was adversely affected by the national teacher's strike (Elliot, 2006)

In models which assessed associations using complete case analyses, children missing data on their parents' country of birth were removed from the analyses. In models which assessed associations using multiple imputation to deal with missing data , these children were retained for analyses. In these imputation models parents' country of birth (alongside other exposures with missing data) were imputed. Further details on this approach are given below.

'Target' sample in NCDS

At ages 7, 11 and 16, the NCDS cohort was augmented with children who had migrated into Britain and were born in the same week as the rest of the cohort, but who were not necessarily born in Britain. Children with the appropriate birth date were identified through local authority or private school records, and so may not have had data from an earlier sweep. In addition, NHS records and media/ advertising appeals were conducted in order to trace any children who had been inadvertently excluded from the baseline sweep[45]. Efforts to trace migrants into Britain after sweep 3 (age 16) were not made.

For the purposes of this analysis, the 'target sample' was restricted to all children who were born in England, Scotland and Wales, in the selected week in March 1958, and who had data at sweep 0 (birth). This means that children who migrated into Britain at a later date were excluded. This ensures that the findings are comparable with other published work, as well as with BCS70. In addition, excluding migrant children will ensure that the sample is only representative of children born in Britain in the index week. This is important as the study is an analysis of children who were born in Britain to migrant (in this case Irish-born) parents. Also because initiatives to enrol migrants to Britain into the cohorts did not continue after age 16, cohort members who were identified through records in childhood will not be representative of all migrant groups to Britain with a similar birth date, as later migrants would not have been included. It is also probable that attempts to recruit later migrants to Britain may not have been completely successful. Therefore including migrant children who were interviewed in later sweeps would potentially introduce bias into the study design.

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[45] Personal communication from Peter Shepherd, also see http://www.cls.ioe.ac.uk/text.asp?section=000100020003

Response rates and attrition within the NCDS

Within the childhood sweeps of NCDS, response was generally good [263]. For example within the full cohort, 86% of cohort members sampled at birth were still within the cohort at age 16 (sweep 3) [263]. Excluding children who were migrants to Britain or had parents not born in Britain or Ireland, this was 78% of those sampled at birth (Table 1). The most significant attrition occurred when cohort members were next sampled in adulthood (age 23), that is at after the time when they would have been likely to have left their parents' home and entered into the labour market, and also when the 'respondent' transferred from carer/ parent to cohort member[263]. It has been noted that response rates in adulthood have stabilised over time, in that of the observed sample at age 23, approximately 80% were still present at age 33 and 42 in the cohort[263]. Of note, much of the attrition due to death occurred in the perinatal period within the birth cohort (sweep 0 at birth). We do not know what proportion of these children would have had Irish parents as country of birth of parents was not asked until sweeps 2 and 3 (age 7 and 11).

The 1970 British Birth Cohort (BCS70)

The 1970 British Birth cohort also sampled approximately 17,000 babies born in a single week in 1970, and then subsequently followed up participants to adulthood. Its aim was to provide a comparison to the earlier 1958 British Birth cohort in understanding the social and medical circumstances of mothers, and associations with neonatal morbidity [264]. Unlike NCDS, BCS70 also included a sample of children born in Northern Ireland, although these children were not followed up after birth [264]. For this reason, children born in Northern Ireland in BCS70 (n=626) have been excluded from the present analysis. For the purposes of this study, only the childhood sweeps of BCS70 (data from when children were aged 0, 5, 10 and 16) will be used for the analysis. Due to time restrictions, it was felt to be outside of the scope of the study to include analyses of the adult sweeps of BCS70, as will be done with NCDS. Response rates for the full sample, and for second generation Irish cohort members in BCS70, are displayed in Table 6-1.

Parental migration history in BCS70

Parents were asked at birth to report their own country of birth. Cohort members with either one or both parents reporting that they were born in Ireland or Northern Ireland were classified as 'second generation Irish'. In order to maintain consistency with

NCDS, the analyses of data from BCS70 are restricted to children who had either one or both parents born in Britain or Ireland.

'Target' sample in BCS70

The 'target' sample for the present analysis were all children born in the index week in 1970 with one or both parents either born in Britain or Ireland. Children born in Northern Ireland (n=626) were excluded, as they were not followed up after birth. In addition children who were born outside England, Scotland and Wales and who migrated into the cohort have been excluded (n=822). There were also some children for whom an address was recorded at baseline in BCS70 but for whom no further details were ever collected (n=366). These children have also been excluded from the BCS70 'target' sample in the present analysis.

Response rates and attrition within BCS70

Table 6-1 shows response rates for the overall sample and for second generation Irish cohort members within the cohort. The relatively lower response rates at age 16 (see Table 6-1) were a reflection of a national teachers' strike which adversely affected data collection at this sweep [264].

Variables and health measures within the two birth cohorts

Data from childhood sweeps of both BCS70 and NCDS were used. Analyses using information from adult sweeps was only performed on data from the NCDS, analyses of BCS70 was restricted to childhood (age 0-16). For clarity, Table 6-2 summarises the measures/ variables used and the sweeps and datasets they were taken from.

In addition, the following figures schematically display main measures used for the analysis, by each cohort (Figure 6-1: NCDS; Figure 6-2: BCS70) and by age/ sweep. The following section will provide further detail on each of the measures used.

Table 6-2: Summary of variables, measures and sources for data

Variable	Dataset	Age	Analysis where these variables will be used
Gender, parental country of birth	NCDS, BCS70	0 (BCS70), 7, 11 (NCDS)	All analyses
Mother's age and education, father's social class (at birth of cohort member)	NCDS, BCS70	Age 0	Childhood analyses of emotional and behavioural health problems
Mother's education, region of birth, employment at 33	NCDS	0, 33	Variables used in imputation equation for analyses of childhood adversity in accounting for downstream adult health*
Social class (manual versus non-manual) across the life-course. In childhood (to age 16)- parental social class, after 16 was cohort member's social class	NCDS	0, 7, 11, 16 23, 33, 42, 44/45.	Used in imputation regression for downstream adult health*
Childhood material adversity: Access to household amenities- (indoor bathroom, indoor toilet and hot water), overcrowding, family financial difficulties, free school meals	NCDS	7, 11, 16	Childhood analyses of emotional and behavioural health problems, analyses of childhood adversity in accounting for downstream adult health*
Childhood: 'Family difficulties' assessed by the health visitor (any one of problems with: housing, finances, physical or mental illness/ disability, learning disabilities, death, divorce, parental separation, domestic tensions, in-law conflicts, unemployment, alcoholism, or any other difficulties 'affecting child's development').	NCDS	7	Analyses of childhood adversity in accounting for downstream adult health*

Variable	Dataset	Age	Analysis where these variables will be used
Childhood material adversity: Access to household amenities- (indoor bathroom, indoor toilet and hot water), overcrowding, ownership of van/ car, social rating of neighbourhood, damp in housing, resident in social housing, free school meals, proportion of home family can afford to heat in winter	BCS70	5, 10, 16	Childhood analyses of emotional and behavioural problems
Mother's mental health as assessed through the Rutter Malaise Inventory	BCS70	5, 10, 16	Childhood analyses of emotional and behavioural problems
Chronic ill health in either parent	NCDS	7, 10, 16	Childhood analyses of emotional and behavioural problems
Recalled childhood adversity, alcohol problems and emotional problems in either parent whilst growing up	NCDS	44/ 45	Analyses of childhood adversity in accounting for downstream adult health*
Adult social adversity measures: Whether lived in over-crowded housing, unemployed, lived in social housing, homeless since previous sweep, lived in social housing, on benefits, access to indoor toilet/ bathroom, difficulties paying bills, access to own telephone, damp or lacked central heating in home, no car, financial difficulties, couldn't afford food or clothing	NCDS	23, 33, 42, 44/ 45	Analyses of childhood adversity in accounting for downstream adult health*
Social support at age 33, 42 and at 44/ 45 (as assessed through the Close Person's Questionnaire)	NCDS	33. 42. 44/ 45	Analyses of childhood adversity in accounting for downstream adult health*
Stressful life events, and job insecurity	NCDS	44/ 45	Analyses of childhood adversity in accounting for downstream adult health*
Drinking behaviour at age 16	NCDS	16	Analyses of alcohol use over the life-

Variable	Dataset	Age	Analysis where these variables will be used
			course
Quantities of alcohol consumed and frequency of alcohol consumption	NCDS	23, 33, 42	Analyses of alcohol use over the life-course
Tobacco use	NCDS	23, 33, 42	Assessed as a mediator in the analyses of poorer self-rated health at mid-life. Assessed as an outcome in the analyses of health-related behaviours over the life-course
Malaise Inventory to assess cohort members' mental health	NCDS	23, 33, 44/ 45	Analyses of childhood adversity in accounting for downstream adult health*
Mid-life hazardous or harmful alcohol use as assessed through the AUDIT	NCDS	44/ 45	Analyses of childhood adversity in accounting for downstream adult health*
Mid-life common mental disorders as assessed through the CIS-R	NCDS	44/ 45	Analyses of childhood adversity in accounting for downstream adult health*
Hazardous alcohol use as assessed through the CAGE	NCDS	23, 33	Analyses of health-related behaviours over the life course in accounting for downstream adult health*
Self-rated health	NCDS	23, 33, 42, 44/ 45	Analyses of childhood adversity in accounting for downstream adult health*

Key ***** *'Downstream adult health' refers to: Common mental disorders, poorer self-rated health, tobacco use and alcohol misuse at mid-life*

Figure 6-1: Variables and measures used in NCDS by sweep/ age

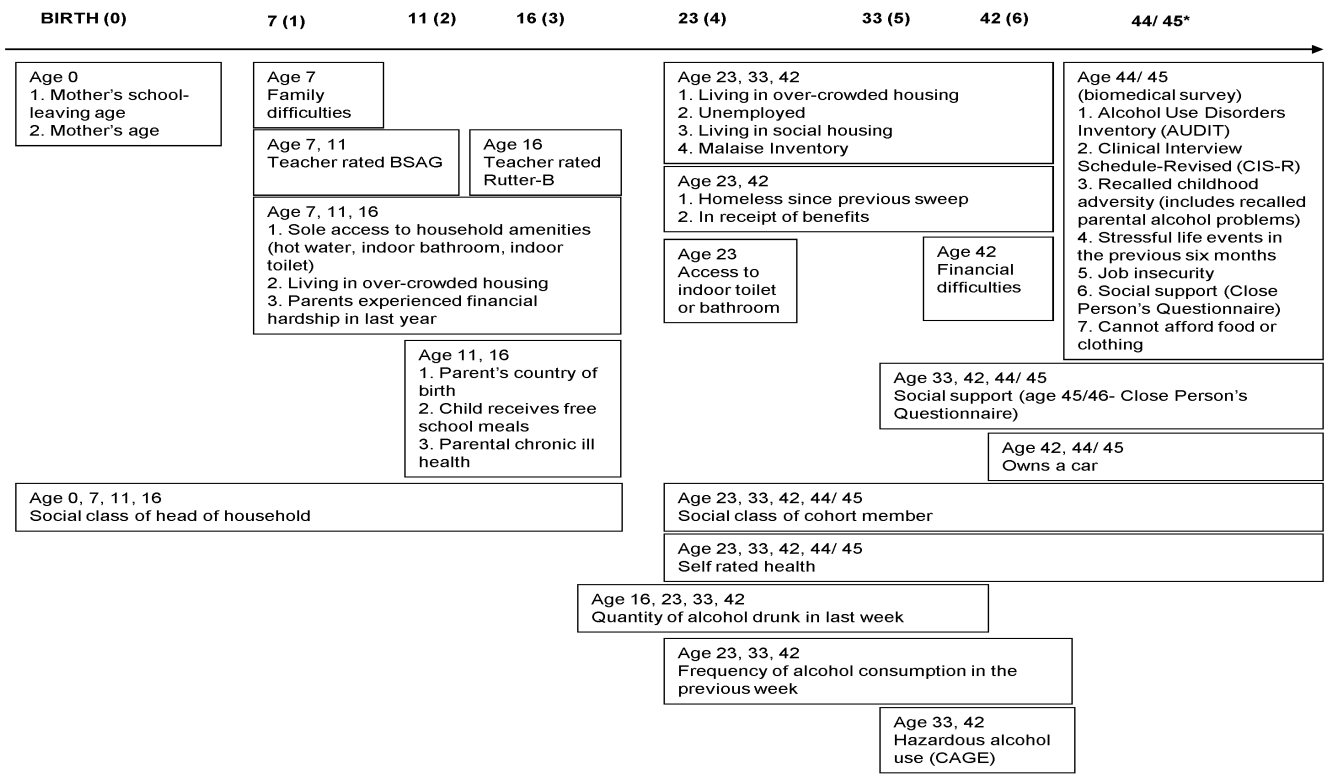
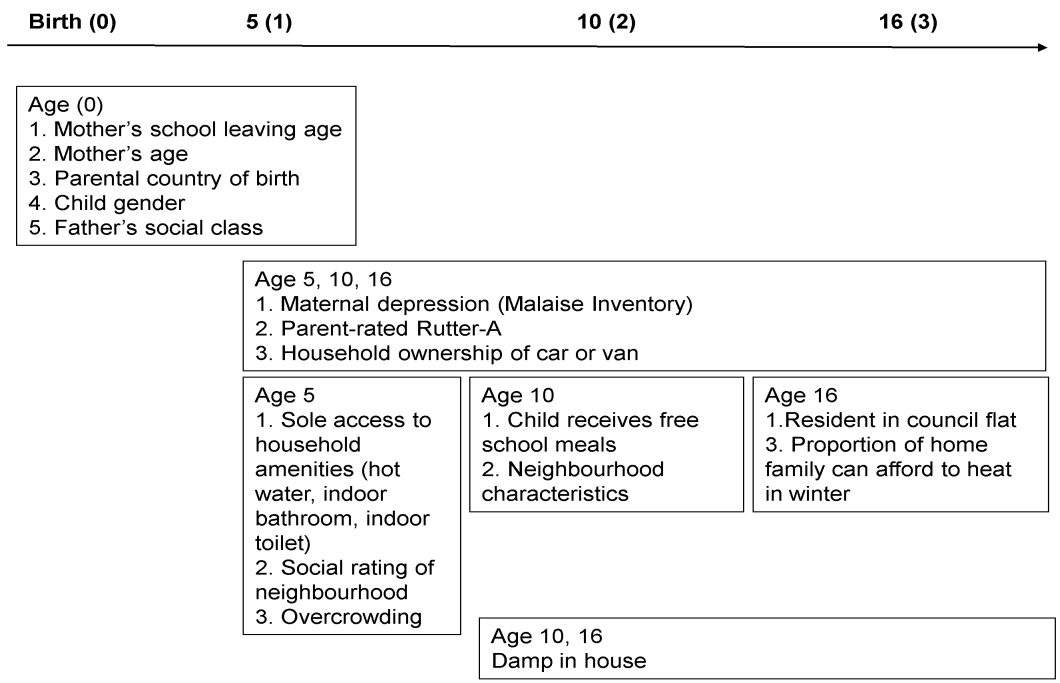


Figure 6-2: Variables and measures used in BCS70 by sweep/ age



Childhood

Social inequality in childhood

In the NCDS, at age 7, 11 and 16, and in BCS70 at age 5, parents of cohort members were asked to report if they had sole access to household amenities (indoor toilet, bathroom and hot water) or lived in overcrowded housing (1+ persons/ room). In NCDS (age 7, 11 and 16) parents were asked to report if they had experienced serious financial hardship in the previous year. In NCDS (age 7) parents were asked if they had faced family housing difficulties within the previous year. At age 11 and 16 parents were asked if their child received free school meals. Finally, health visitors assessed whether there were any 'family difficulties' at age 7. These comprised any one of problems with: housing, finances, physical or mental illness/ disability, learning disabilities, death, divorce, parental separation, domestic tensions, in-law conflicts, unemployment, alcoholism, or any other difficulties 'affecting child's development'. Responses to this measure were summed and dichotomised into 'one or more family difficulties' versus 'none'.

Within BCS70, at age 5, 10 and 16, parents of cohort members were asked to report if they owned a car or van. Parents were also asked if they had damp in their housing and if their child received free school meals (age 10) or if the family could afford to heat their entire home during the winter (age 16). A social rating of neighbourhoods ('well to do' versus 'average'/ 'poor'/ 'rural') was taken at age 5, judged by interviewers. Parents in BCS70 were asked about neighbourhood characteristics (age 10) and whether or not they lived in social housing (age 16).

Finally, when cohort members were aged 44/ 45, they were asked to recall if they had grown up in poverty or financial hardship as children. Responses to this question were dichotomised into '*yes'/ 'no'* responses.

Parental occupational social class

In the childhood sweeps of NCDS (birth and ages 7, 11, 16) and in BCS70 at birth, Registrar General Occupational Social Class of the household was assessed by asking after the social class of the father or male head of household. In some instances there was no male head of household reported; in these instances no social class was

recorded. For these cases a ‘manual social class’ coding was made46. In other instances, cohort members were present but did not provide the information they were asked, in these instances social class was encoded as ‘missing’. In some of the earlier sweeps of NCDS, social class IV was further broken down into ‘IV non manual’ and ‘IV manual’; in these instances the variable was grouped together as ‘manual’.

Parental health as assessed in childhood

In NCDS, parents were asked to report parental chronic health problems when cohort members were aged 11 and 16. In BCS70, at ages 5, 10 and 16, mothers were asked questions from the self-rated 24-item Rutter Malaise inventory, which assesses mental health [265]. The scale asks questions such as, “*Do you often feel miserable or depressed*?”, “*Do you often get worried about things*?”, “*Do you usually wake unnecessarily early in the morning?”* and is thought to assess depression [266]. The scale has adequate reliability, with comparable results across gender and socioeconomic position[266]. Within BCS70, methods for response by mothers on this scale differed across sweeps. At age 5 mothers could answer each item with a ‘yes’ or ‘no’ response (yielding a maximum possible score of 24). At age 10 a visual analogue scale ranging from 0-100 was used. At age 16 a three-point Likert scale (maximum possible score: 48) was used [267]. To aid comparability across sweeps, summed scores at each sweep were dichotomised , with the top fifth of the distribution was taken as indicating “moderate” to “severe” psychological disturbances in the parent[267].

In NCDS, cohort members were also asked when aged 44/ 45 (in the biomedical sweep) to recall their childhood and were asked if either parent had had an alcohol or emotional problem when they were growing up.

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46 Personal communication from Dr Charlotte Clark, QMW (16/12/2010); in previous research from this dataset ‘no male head’ has been classified as ‘manual’. This assumption may be right given the historical context of the dataset; families with no male head were unlikely to be affluent. Although this approach may misclassify some cohort members, sensitivity analyses performed by Dr Clark on classification using the two approaches (ie. classifying children with ‘no male head’ with children who had a ‘father of manual social class’ versus dropping these cases altogether) made very little difference to the findings, and instead this approach served to increase the power of the dataset.

Childhood Psychological Health

Both NCDS and BCS70 assessed childhood emotional and psychological health at all sweeps in childhood, excluding birth. Slightly different approaches were taken across cohorts and also within the same cohort at different ages. The following section summarises each measure and the way these measures were adapted for analysis in order to aid comparability across sweeps and cohorts.

Bristol Social Adjustment Guide (teacher-rated) (age 7, 11; NCDS)

The Bristol Social Adjustment Guide [268] was used to assess teacher-rated emotional and behavioural problems in the cohort member, when they were aged 7 and 11 in NCDS. Teachers' responses to the 146 questions resulted in overall totals for 12 domains of symptom groups, referred to in the guide as 'syndromes'[268, 269]. Syndromes were derived through a theoretical approach and an assumption that the behaviours underlying each syndrome were similar[270]. 'Syndromes' were: unforthcomingness, withdrawal, depression, anxiety for acceptance by adults, hostility towards adults, 'writing off' adults, anxiety for acceptance by children, hostility towards children, restlessness, 'inconsequential' behaviour, miscellaneous symptoms/ nervous symptoms [269].

Rutter-B Guide (teacher-rated) (age 16; NCDS)

At age 16, teachers were asked to rate the emotional and behavioural health of cohort members using the Rutter School Behavioural Scale (Rutter-B), in NCDS [271]. The teacher's scale comprised 26 items and took only a few minutes to complete[271, 272]. Teachers responded to questions using a three point scale ranging from 'certainly applies', 'applies somewhat' or 'doesn't apply' [271]. Responses are encoded 0, 1 or 2, with total scores potentially ranging from 0 to 52 [271]. Re-test reliability assessed by repeating the scale two months later has been reported as good (correlation 0.89), with inter-rater reliability assessed between two teachers also reasonable (correlation 0.72) [271]. Furthermore, In a previous assessment of the teacher-rated Bristol Social Adjustment Guide (as used at age 7 and 11 of NCDS) and the Rutter-B (as used at age 16 in the NCDS) very high correlations have been found between the two scales (cited in [273]).

Rutter-A Guide (parent-rated) (age 5, 10, 16; BCS70)

In BCS70, the Rutter-A was completed by parents (usually mothers) or the primary care giver of the child. This scale was administered when children were aged 5, 10 and 16. The parent scale of the Rutter consisted of 31 items regarding the child's behaviour, 23 of the items overlapped with those of the 26-item Rutter-B (teacher-rated scale). At age 5 and 16 in BCS70, parents responded to questions using a 3-point response scale with responses ranging from '*does not apply'* '*applies somewhat'* or '*definitely applies'* (*cited in* [274]), where responses were encoded as equal to 0, 1 or 2, respectively. At age 10 in BCS70 parents responded to questions using a Visual Analogue Scale [274]. Higher scores indicated a greater likelihood of emotional and behavioural difficulties.

Internalising versus externalising childhood emotional and behavioural disorders

The constructs of 'internalising' and 'externalising' disorders are widely used in child Psychiatry. Whereas 'internalising' disorders refer to anxiety and depression, 'externalising' disorders refer to behavioural problems such as conduct and anti-social behaviours[275]. For some aspects of the analysis which will be presented here, especially that which relate to alcohol use disorders, it was deemed necessary to differentiate between childhood internalising and externalising disorders, given an extensive literature which has suggested associations specifically between externalising childhood behaviours and later life alcohol misuse disorders [276, 277]. The approach to determine which 'clusters' of symptoms should be grouped into either 'internalising' versus 'externalising' disorders is described in this section.

In previous analyses of summed scores from the Bristol Social Adjustment Guide (administered at age 7 and 11 in NCDS) Ghodsian showed that a factor analysis using varimax rotation of scores resulted in a two-factor solution [275]. Ghodsian described the first derived factor as a 'restless/ outgoing and anxious' domain, which comprised the following syndromes: anxiety for acceptance by adults, hostility towards adults, 'writing off' adults, anxiety for acceptance by children, hostility towards children, restlessness, 'inconsequential' behaviour [275]. He described the second derived factor as a 'withdrawn/ inhibited and anxious' domain, and this comprised: unforthcomingness, withdrawal, depression, 'writing off' adults, and miscellaneous symptoms [275]. Later authors have re-defined these domains as 'externalising' and

'internalising' disorders, respectively[88]. In previous work the ''writing off" adults' syndrome has been dropped [88], as this syndrome cross-loads on both internalising and externalising disorders [275]. This approach to classification was used in the present study.

To derive an equivalent scale of 'internalising' versus 'externalising' symptoms an equivalent approach was taken for symptoms assessed on the Rutter-B at age 16 in NCDS. Internalising problems comprised the following symptoms: worries, solitary, miserable, fearful, and fussy whereas externalising problems comprised fights, destructive, not liked by other children, lies, steals, resentful, irritable, disobedient and bullied other children[88]. Scores on each of the symptom groups were summed, square root transformed and the top 13% taken to indicate a 'case' of either internalising or externalising problems, in keeping with the approach taken by other authors [88].

Comparison of childhood emotional and behavioural measures across sweeps and cohorts

In order to aid comparability of measures across cohorts and sweeps several approaches to the scales assessing childhood emotional and behavioural health were taken:

In Chapter 7, the results of analysing emotional and behavioural measures in the childhood sweeps of both cohorts are presented. This part of the study attempts to draw comparisons in findings between NCDS and BCS70. The approach taken in Chapter 4 was to use summed scores on each of the scales. For all of the scales (BSAG, Rutter-A, and Rutter-B) higher summed scores indicate a higher likelihood of emotional or behavioural problems [268, 271, 272, 275]. Therefore the analyses in chapter 4 presents summed scales as continuous 'counts' of symptoms. The distribution of the scores was highly skewed, and in some cases had a preponderance of zeros[47], therefore for this part of the analysis specific analytic methods such as negative binomial regression with zero-inflation was used; this is described in more detail in the *Statistical Methods* section of this chapter.

[47] See *Appendix A* for graphs of the distribution of each of these measures

In Chapter 8, an analysis of mid-life health using data from the NCDS is presented. For this part of the analysis, childhood emotional and behavioural health was assessed as a potential contributor to later-life (adult) morbidity. In this set of analyses, total scores on the teacher-rated BSAG (7 and 11) and Rutter-B (16) were square root transformed. A cut-point for the top 13% was then taken [273]. This approach has been used by a number of investigators [88, 273], with scores in the top 13% taken to represent children deemed to be most '*maladjusted*' [273].

In Chapter 9, the contribution of childhood *internalising* and *externalising* disorders to life-course alcohol misuse amongst second generation Irish people in NCDS, will be presented. The method for determining two separate sub-scales for childhood internalising and externalising disorders was described in the previous section. This approach was taken to derive total scores for 'internalising' versus 'externalising' disorders at age 7, 11 and 16 in NCDS. Each summed scale was then square root transformed and the top 13% taken to indicate a 'case' of either internalising childhood disorders or 'externalising' childhood disorders[88][48].

Adulthood

Data when cohort members were aged 23, 33, 42 and 44/ 45 (biomedical sweep) in NCDS, was used to examine adult health and social measures across the life-course in second generation Irish cohort members relative to the rest of the cohort. Note that in this study I have not examined data from the adult sweeps of BCS70, as time constraints have not permitted this. Therefore the following section focuses on variables from the adult sweeps of the NCDS.

Material and social adversity measures

Cohort members were asked if they lived in overcrowded housing (> one person/ room) (age 23, 33, 42), were unemployed (age 23, 33, 42), lived in social housing (age 23, 33,

[48] Slightly different approaches were taken to categorise childhood psychological health because previous work has suggested that both internalising and externalising disorders are associated with early adulthood psychological morbidity and mid-life common mental disorders (for example see *Clark et al 2007*), however for tobacco use and alcohol misuse in adulthood, childhood externalising psychological disorders increase the risk whereas internalising disorders may reduce the risk of tobacco use (see Fischer et al, 2012).

42), had been homeless since the previous sweep (age 23, 42), received benefits (23, 42), had access to an indoor toilet or bathroom (age 23), had difficulties paying bills (33, 45), had a telephone (age 33), had damp or lacked central heating in their house (33), had no car (42, 45), had financial difficulties (42), or couldn't afford food or clothing (45).

Cohort members were asked to report stressful life events experienced within the last six months, at age 44/ 45. These were: cohort member or close relations suffering serious illnesses, injury/ assault, death of parent/ child/ partner, death of a close friend/ relative, end of a serious relationship or separation, serious problems with a close friend/ neighbour/ relative, serious disappointments at work, cohort member/ partner fears losing one's job, losing one's job, major financial crises, problems with the police, and experiences of theft. Responses were dichotomised into '*experienced no stressful life events'* versus '*experienced 1+ stressful life events'*. At age 44/ 45, cohort members' perceived job security was also enquired after.

Occupational social class in adulthood

In adulthood sweeps of NCDS (age 23, 33, 42 and 46) social class according to the Registrar General Social Class classification system was asked of all cohort members. This variable was either retained in its original form or dichotomised into 'manual' versus 'non-manual'.

Social support measures

At age 33 (1991) respondents were asked a number of questions assessing social networks, social support and indicators for material hardship and adversity. Questions on social support were taken from the British Social Attitudes Survey (*cited in* [278]). Social support was assessed by asking respondents to name up to four people that they thought they could turn to if faced with a number of hypothetical situations (see table 3). Social support sources could range from 'personal sources of support'[278]; e.g. 'spouse/ partner', 'parent/ in-law', 'other relative', 'friend/ neighbour', 'work colleague' or be 'organisational sources of support'[278]. These included 'church, charity, social services', 'someone you pay for help', other sources'. Respondents were then asked to report who they would turn to for support if faced with a number of hypothetical situations (Table 6-3). Hypothetical situations were either related to practical support or

emotional support (see Table 6-3). For ‘emotional support’ only sources of support from ‘personal’ sources were counted, whereas for practical support both ‘organisational’ and ‘personal’ were counted [278]. Reported sources were summed to derive a total score. People reporting 3 or less forms of support were deemed to have ‘low’ social support, and people reporting 4 or more forms of support had ‘medium/ high’ support [278].

Table 6-3: Questions assessing social support at 33 in NCDS

Hypothetical situation
The following questions are about the people - family, friends, and others to whom you can turn for help and advice; Each question relates to a different problem that you might face:*
Practical social support
Suppose you had the *"flu"* and you had to stay in bed for a few days, and needed help around the home, with shopping and so on
Suppose you needed to borrow a large sum of money.
There are some household and garden jobs you really can't do alone - for example, you may need someone to hold a ladder
Emotional support
Suppose you needed advice about an important change in your life - for example, about a job, or moving to another part of the country
Suppose you were very upset about a problem with your husband, wife *or* partner, and had not been able to sort it out with them. Even if you are not married or have no partner, what would you do if you were?
Suppose you felt Just a bit down *or* depressed, and you wanted to talk about It

***Key:** (Refer to previous text) Reported sources of social support were summed to derive a total score. For each hypothetical situation, respondents were invited to state the number of sources of social support that they could call on for help. People reporting 3 or fewer forms of support were deemed to have 'low' social support, and people reporting 4 or more forms of support had 'medium/ high' support (Adapted from [278]).*

At age 42, cohort members reported if they had someone they could turn to for advice/ support. Responses to this question were dichotomised. At age 44/ 45, the Close Person's Questionnaire [279] assessed social support provided from the respondent's closest nominated person. The Close Person's Questionnaire is a structured validated instrument which assesses respondent's perceived levels of social support provided by one or more nominated persons [279]. For this study, respondents were asked to rate levels of social support provided by one nominated close person. Summed scores resulted in three sub-domains of social support which were: practical social support, confiding/ emotional social support, and negative social support[279]. Higher scores indicated higher levels of social support in each sub-domain, for negative social support this was reversed [279].

Health measures in adulthood

In this section key health measures, assessed at multiple time-points across the life-course of cohort members in the NCDS, will be discussed. Broadly, health measures and health-related behaviours assessed across the life-course within the cohort included: common mental disorders, self-rated health, tobacco use and alcohol misuse.

Common mental disorders

Malaise Inventory

The Malaise Inventory [280] was used to assess common mental disorders at ages 23, 33, and 42. The Malaise Inventory was developed from the Cornell Medical Health Index Questionnaire[281] which is an extended 195 questionnaire assessing emotional health [280]. The much shortened Rutter Malaise Inventory has only 24 items asking after somatic and emotional health and incorporates 14 questions from the original Cornell Medical Health Index [280]. The questions do not specify a time period but it is apparent to respondents that the questions are enquiring after the recent past, as the wording is in the present tense (e.g. "*Do you often have back ache?*")[266]. In validation work examining the Malaise Inventory, Cronbach's alpha assessing the internal consistency of the Malaise Inventory was rated as 0.77 at age 23 and 0.80 at age 33 in the NCDS [266]. Rutter and colleagues also reported that the reliability of the scale was good when assessed in 35 mothers who were asked to complete the questionnaire on two occasions as correlations between the two sets of responses were

high (0.91) (although Rutter did not state the amount of time which had elapsed between the two assessments) [265]. Rutter noted that the scores on the Malaise Inventory "*differentiated moderately well between parents with and without psychiatric disorder*" [265]. When Rutter and colleagues have presented assessments of parents of children with neuropsychiatric conditions a cut-point of 6 or more on the Malaise Inventory has been specified [282].

In a study which used Psychiatrist-determined 'caseness' for depression as the 'gold standard', the sensitivity and specificity of the Malaise inventory, at a number of different cut-points was assessed [266]. The differing values for sensitivity and specificity according to cut-points on the Malaise Inventory have been outlined in Table 6-4 (the text in this table has been adapted from [266]). This study noted the consistency of findings across gender and socioeconomic position[266].

Table 6-4: Sensitivity and specificity of cut-points on the Malaise Inventory

Cut point on the Malaise Inventory	Sensitivity	Specificity
4/5	0.90	0.65
5/6	0.73	0.81
6/7	0.64	0.88
7/8	-	-

(This table has been adapted from text in Rodgers et al[266])

As a result of the validation study by Rodgers *et al* [266], some authors have employed a cut-point of 7 or more on the Malaise Inventory to indicate 'psychological distress' or depression [88, 120]. However, other authors have employed a cut-point of 8 or more[283], even though data relating to the sensitivity and specificity of this particular cut-point was not discussed in the paper by Rodgers *et al* [266]. The cut-point of 8 or more seems to have become 'conventional', with this approach frequently reported in the literature [284], as well as suggested in user-documentation and datasets released by the Economic and Social Data Service[49] [267]. As the latter 'conventional' approach was used by the data depositors to create a cleaned variable for the Malaise Inventory, this approach (cut-point of 8 or more on the Malaise Inventory) to indicate 'psychological distress', was used in this study.

The Clinical Interview Schedule-Revised (CIS-R)

The Clinical Interview Schedule-Revised (CIS-R) will be used to assess for mid-life common mental disorders [81]. This is a 14-item structured validated instrument which has been devised for administration by lay interviewers [81]. Scores from the CIS-R have been utilised in a variety of approaches.

In the first approach, it is possible to use diagnostic algorithms which approximate to ICD-10 diagnoses for common mental disorders[285]. In this approach, responses to the CIS-R lead to diagnoses which are then arranged hierarchically. Using this approach the following psychiatric diagnoses may be derived: depressive episode (mild, moderate or severe), anxiety disorders (including, Generalised Anxiety Disorder, Panic, Phobias (including Simple Phobias, Obsessive Compulsive Disorder, Social Phobias, Panic Disorder and Agoraphobia) and Mixed Anxiety and Depressive Disorder[286]. In previous research using a community sample in Leicestershire, the concordance of the CIS-R to ICD-10 diagnoses as assessed through the SCAN (Schedules for Clinical Assessment in Neuropsychiatry (SCAN) was reported as poor for 'any' ICD-10

[49] Personal correspondence with Jack Kneeshaw (at ESDS) and Samantha Parsons (CLS): Although the 8+ cutpoint has been widely adopted in analyses and in user documents there have been no validation studies examining this specific cut-point. Investigators have used a wide variety of approaches (eg cut-point of 3+ or 4+ on shortened versions of the scale (9 items)) however again no obvious validation studies have formed the basis for these decisions. (Email correspondence; 19 September 2011)

common mental disorders or for depressive disorder[287]. In a later study assessing concordance, the CIS-R gave moderately valid concordance, compared to the SCAN[288]. Methodological issues between the two studies may have accounted for these differences, as well as differences in the study populations [287, 288].

In the second approach, sections in the CIS-R are summed to give a total score, which could range from 0, up to a total of 57. A cut-point of ≥12 indicates '*common mental disorders'* [81]. This cut-point based approach has been used in many previous national surveys, including the UK National Psychiatric Morbidity Survey [286]and the Ethnic Minorities Psychiatric Illness Rates in the Community Survey[5].

In the NCDS a shortened form of the CIS-R was used, in which sections asking after some of the symptoms in the full-scale CIS-R, as indicated in Table 6-5 were omitted[50]. Table 6-5 shows that 9 of 14 possible sub-sections on the CIS-R were administered. The authors of the abbreviated CIS-R scale (as used in the biomedical sweep of NCDS), derived categorical diagnosis from these items, by using ICD-10 diagnostic algorithms [289]. Derived diagnoses were: Major Depression (mild, moderate and severe), Generalised Anxiety Disorder, Agoraphobia, Social Phobia, and Panic Disorder [88].

[50] Personal communication from Professor Stephen Stansfeld: The full-scale CIS-R could not be administered in the NCDS biomedical sweep due to time and logistic constraints.

Table 6-5: CIS-R symptoms assessed in biomedical survey at age 44/ 45

Included in biomedical survey	Not included in biomedical survey
Fatigue	Worry
Sleep problems	Obsessions
Irritability	Somatic symptoms
Depression	Compulsions
Anxiety	Worry about physical health
Depressive ideas	
Concentration/Forgetfulness	
Phobias	
Panic	

Key: **Appetite is also measured but is not given a symptom score: it does however contribute to diagnoses. (Table has been adapted from Clark & Stansfeld, 2004 [289])*

A second approach might be to try and adapt a cut-point as equivalent to the traditional 11/12 cut-point on the CIS-R. This is the approach which was taken in this study, as this has the benefit of comparability with other datasets that have examined common mental disorders using the CIS-R, with the traditional 11/ 12 cut-point on the full scale. Such studies utilising this approach have examined the mental health of Irish people living in England [5]. This approach also has the advantage of being more comparable to findings from other national surveys from Britain, such as the UK National Psychiatric Morbidity Survey [290]. The approach to determine the alternative cut-point (on the abbreviated 9-item instrument, as administered in NCDS) is detailed in the next section.

Devising a cut-point on the shortened CIS-R which was equivalent to the 11/12 cut-point, on the full-scale CIS-R

In order to determine an equivalent cut-point for the CIS-R as used in the NCDS, data from the 2000 National Psychiatric Morbidity Survey [290] as well as the Ethnic Minorities Psychiatric Illness Rates in the Community (EMPIRIC) [5] were used. Both of these datasets assessed common mental disorders using the full-scale CIS-R in a nationally representative sample of adults aged 16-65, and were performed at around the same time at which the CIS-R would have been used, in the biomedical sweep of the NCDS. In both datasets, a summed score of items from the CIS-R was determined, which had the same items as those which had been omitted in the NCDS (worry, obsessions, somatic symptoms, compulsions and worry about physical health; *see Table 6-5*) taken out.

This resulted in an equivalent abbreviated scale in the NPMS and in the EMPIRIC. To determine a cut-point equivalent to 11/12, a linear regression of the full (14-item) scale from the CIS-R was performed against the abbreviated (9-item) scale from the CIS-R in each dataset, and the resultant regression equation was used to determine what the equivalent cut-point would be on the abbreviated 9-item scale. (Table 6-6) shows the results of taking this approach in the 2000 UK National Psychiatric Morbidity Survey[290] and in the 2000 Ethnic Minorities Psychiatric Illness Rates in the Community Survey (EMPIRIC) [5].

Table 6-6: Comparison of cut-points on the CIS-R (full version compared to shortened version)

Survey	Total n (un-weighted/ weighted)	Range on full scale in the survey	Range on the shortened scale (with sections omitted)	Mean, SE*	β, inter-cept*	Cut-point, calculated through regression equation	Expected agreement	Observed agreement	κ†	Expect-ed agree-ment	Observ ed agree-ment	κ†
							Cut-point of 8 (8 or more)			**Cut-point of 9 (9 or more)**		
UK NPMS	8580/ 41437172	0-54	0-35	3.92 (0.08)	0.72, 0.09	8.74	70.45%	95.02%	0.83	72.49%	96.33%	0.87
UK NPMS	*These kappas were calculated by hand and take into account proportions weighted according to the survey design*						71.90%	95.02%	0.82	74.07%	96.33%	0.86
EMPIRIC	4281/ 4281	0-44	0-30	4.16 (0.09)	0.69, 0.17	8.42	69.27%	94.28%	0.81	71.48%	95.68%	0.85
EMPIRIC	*These kappas were calculated by hand and take into account proportions weighted according to the survey design*						69.55%	94.26%	0.81	71.67%	95.66%	0.85

Key **Taking into account survey structure/ design and weights; †Kappa was p<0.001 in all instances and compared the agreement between the new cut-point to the old cut-point of 12 or more on full scale of the CIS-R. Note kappa calculated in STATA on un-weighted data is slightly different when calculated by hand on weighted data. This is due to minor differences in the 'expected agreement' proportions (B) using the weighted versus unweighted data; κ= kappa.*

Comparing the cut-offs on the abbreviated scale to that of 12 on the full-scale, in both surveys Kappa for cut-points of 9 or more were slightly better than cut-points of 8 or more. Retaining the survey weights and calculating kappa by hand led to very marginal differences which still suggested that a cut-point of 9 or more would be superior. This cut-point (9 or more) was therefore adopted for this study.

Self-rated health

In NCDS, at age 23, 33, 42 and 44/ 45, cohort members were asked to rate their health using a standard self-rated question on health. In all instances, respondents could answer with: 'excellent', 'good', 'fair' or 'poor'. These responses were dichotomised into 'excellent/ good' versus 'fair/ poor'.

The predictive validity of a single-item measure for self-rated health and later mortality has been established; the association remains irrespective of the age of respondents [73]. In a previous systematic review and meta-analysis, a dose-response association was noted between this question and the relative risk of mortality, which remained after adjustment for socioeconomic position, depression, co-morbidity, functional status and cognitive function [73]. As the cohort is still relatively young, it will not be possible to look at mortality directly, therefore self-rated assessment of health may be taken as a proxy measure for mortality.

Alcohol use

Quantities of alcohol consumed across the life-course

At age 16, parents of cohort members were asked to report if their child had drunk alcohol in the previous week, and if so, the quantities of alcohol consumed in the previous week. At age 23, 33, 42, cohort members were asked to report their total alcohol consumption in the previous seven days. Units of alcohol at each sweep were calculated according to standard convention; that is one unit of alcohol is equivalent to a half pint of beer, a small glass of wine, a standard pub measure of spirit or a small glass of sherry (*cited in* [291]) . As a reflection of historical trends in alcohol use, respondents

were also asked if they consumed 'Alcopops', when they were aged 42; this was calculated as equivalent to 1.5 units of alcohol[51].

Hazardous alcohol use and dependence (CAGE)

At age 33, and 42, the CAGE was used to assess alcohol abuse and dependence [292]. The CAGE comprises four questions *("Have you wanted to **C**ut down your alcohol use lately?" "Do you get **A**ngry if other people suggest you should cut down your alcohol use?" Do you feel **G**uilty about the amount of alcohol you consume?" Have you ever needed an **E**ye-opener?"*)[292]. Compared to many other screening instruments for alcohol use, it has the advantage of being a brief and relatively easy to administer questionnaire, which is now widely used in both clinical and research settings.

The CAGE was originally developed in a general hospital setting, where medical and surgical patients agreed to a lengthy interview [292]. As a result of this interview the authors were able to distil down the interview into four questions (as listed above), which were thought to be highly indicative of hazardous or dependent alcohol use [292]. In the original report the authors suggest that one positive response on the CAGE should raise suspicion of an underlying alcohol problem [292]. At a cut-off of two or more, inter-rater reliability on the CAGE has been reported as ranging between kappa=0.15 to kappa=0.83, and the CAGE has been reported as having adequate test-retest reliability at this cut-point (r=0.80 to r=0.95). Internal consistency of the questionnaire has been reported as ranging from 0.52 to 0.90 [293]

Since this study, the conventional approach to using the CAGE has tended to be to employ a cut-point of two or more to indicate alcohol abuse or dependence, although investigators have at times also employed cut-points of one or more (*cited in* [294]). As the CAGE has been extensively studied, Table 6-7 provides some published sensitivity and specificity figures either employing a cut-point of one or more, or a cut-point of two or more

[51]See: http://www.nhs.uk/Livewell/alcohol/Pages/alcohol-units.aspx

Table 6-7: Sensitivity and specificity values of the CAGE, from previous research

Study (author, year)	Population	'Gold-standard'	Sensitivity	Specificity
Cut-point of one or more				
Cherpitel, 1995 [295]	A&E attendees	Alcohol section of the CIDI, according to ICD-10 criteria for dependence/ harmful alcohol use	86%	66%
Bush et al, 1987 [296]	Adults admitted to orthopaedic & medical facility	DSM-III criteria for alcohol dependence and abuse, + MAST questionnaire, NIAAA questionnaire	85%	89%
Matano et al, 2003 [297]	Highly educated employees	'Binge' drinking- 5 or more drinks (men) or 4 or more drinks (female)	66.7%	84.1%
Kelly et al, 2004 [298]	Adolescents attending A&E	DSM-IV criteria for alcohol abuse and dependence	66%	58%
Cut-point of two or more				
Bernadt, 1982 [299]	Patients admitted to the Maudsley	Case notes to determine alcohol dependence or 'excessive drinking'	Excessive drinking: 93% Dependence: 91%	Excessive drinking; 76%; Dependence:77%
Beresford, 1990 [300]	Adults in a general hospital	DSM-IIIR criteria for alcohol dependence, through structured interview	76%	94%
Bush et al, 1987 [296]	Adults admitted to orthopaedic & medical facility	DSM-III criteria for alcohol dependence and abuse, + MAST questionnaire, NIAAA questionnaire	76%	96%
Cherpitel, 1995 [295]	A&E attendees	Alcohol section of the CIDI, according to ICD-10 criteria for dependence/ harmful alcohol use	75%	82%
Kelly et al, 2004[298]	A&E(adolescents)	DSM-IV criteria for alcohol abuse/ dependence	53%	78%

As the figures displayed in Table 6-7 suggest, for determining alcohol abuse or dependence, at the cut-point of one or more on the CAGE, sensitivity is improved over specificity, whereas at the higher cut-point of two or more, gains in improved specificity are offset by a reduction in sensitivity for determining alcohol abuse or dependence (Table 6-7). Some authors have advocated using a cut-point of one or more, especially in low prevalence populations (*cited in* [294]).

For example, a recent meta-analysis compared the CAGE to DSM criteria for alcohol abuse or dependence, reported sensitivities on the CAGE ranging from 1.00 to 0.61 and specificities ranging from 0.88 to 0.37, when employing a cut-off of one or more. At the higher cut-off of two or more, sensitivity on the CAGE ranged from 0.92 to 0.46 and specificity ranged from 0.95 to 0.62 [294]. At either cut-off the sensitivity was enhanced in in-patients versus patients in primary care, with a 'dramatic fall' in sensitivity when the cut-off of two was used over the cut-off of one or more [294]. The authors of this meta-analysis noted that the correlation coefficients for sensitivity and specificity at each cut-off did not support an 'implicit' cut-point difference [294]. The authors concluded that the CAGE was '*only of limited value at the recommended cut-point* ' of two or more, for the purposes of screening [294].

In keeping with this, one other systematic review found that where both cut-offs (of one versus two or more) were used in studies, the lower cut-off tended to have a higher sensitivity, although slightly lower PPV than the higher cut-off of two or more for alcohol abuse or dependence [301]. These findings would be in keeping with the figures displayed in Table 6-7.

As the present study will be using a population based sample of respondents, and because the prevalence of alcohol is expected to be lower in this population than in hospital or psychiatric in-patient populations, a cut-off of one or more on the CAGE will be employed for analyses.

Harmful, hazardous and 'binge' alcohol use (AUDIT)

At mid-life (age 44/ 45) in the biomedical sweep of NCDS, the *Alcohol Use Disorders Identification Test* (AUDIT) was used to assess hazardous, harmful and 'binge' alcohol abuse [302]. The AUDIT comprises ten questions which cover domains relating to

frequency of alcohol use, social problems resulting from alcohol use and questions assessing alcohol dependency [302]. The original report recommended that scores in the 8-15 range indicate hazardous use, scores from 16-19 indicate harmful use, and scores which are 20 or more indicate possible alcohol dependence whereby further clinical assessment is recommended [302]. Subsequent to this, the authors of the original report have recommended modifying the cut-off of 8 by raising or lowering it by 1-2 points, depending on the population being assessed[302].

Recently, there has been at least one systematic review and meta-analysis, examining the psychometric properties of the AUDIT [303]. This systematic review found a large degree of heterogeneity in studies assessing the sensitivity and specificity of the AUDIT across settings[303]. At the cut-point of 7/8 the sensitivity and specificity of the AUDIT in primary care (sensitivity: 0.31 to 0.89 and specificity: 0.83 to 0.96) was lower than studies assessing it in hospital in-patient and emergency department settings (sensitivity/ specificity of AUDIT in in-patient settings: 0.93/ 0.94 and sensitivity/ specificity of AUDIT in A&E setting: 0.72/ 0.88)[303]. The outcome in these studies were 'quantity or frequency of alcohol' and/ or 'heavy episodic drinking', assessed through self-report, diagnostic interviews and instruments such as the CIDI[303]. The review concluded that 'population-specific' cut-offs did not offer major improvements over 'general' cut-offs of 7/8 [303].

For the purposes of the present study, cut-points as recommended within AUDIT user documents, were used[302]. In addition, the AUDIT also asked after alcohol behaviours at mid-life [302]. Respondents were asked to report if they had had '6 or more (standard)[52] drinks' in one sitting in a given time interval. This approach (of using '6 or more standard drinks in one drinking episode irrespective of gender) has been used by other investigators to define 'binge' alcohol use within the British context [192], and was also used in this study to define 'mid-life binge alcohol use' behaviours.

[52] 'Standard' measures of alcohol vary according to international context, but within the UK is equivalent to one unit of alcohol (half pint of normal strength beer, one small glass of wine, one shot of spirit) or 8g of ethanol (*in* Babor, T.F. and et al, *AUDIT: Alcohol Use Disorders Identification Test: Guidelines for use in primary care*. 2nd ed. 2001: WHO).

Tobacco use

Cohort members in NCDS were asked to report their tobacco use when they were age 16, 23, 33 and 42. Responses to this question were categorised as 'never smoked', 'ex/ occasional smoker', and 'current smoker'. Responses to this question at the three time-points were further aggregated into a 'current or ex-smoker' versus 'never smoker' (over the life-course) binary variable.

Statistical analysis

As data from two birth cohorts were used to address a variety of research questions, a number of statistical analytic methods were used. In the first part of this section the statistical methods which underpinned analyses examining data from childhood in BCS70 and NCDS (with results of this analysis presented in Chapter 4) will be discussed. In the second part of this section, the methods which were used to analyse childhood and adult sweeps of data from the NCDS will be discussed. One of the challenges faced was specific to the problem of missing data due to attrition, a common problem in analyses from longitudinal datasets. As will be discussed, this was more noticeable when analyses using data from later sweeps of NCDS was attempted (compared to analyses using data from childhood sweeps only) and so necessitated a slightly different analytic and statistical approach.

Analytic plan and statistical analysis of childhood emotional and behavioural problems in NCDS and BCS70

In Chapter 7 the prevalence of childhood emotional and behavioural problems in second generation Irish relative to non-Irish cohort members will be assessed in NCDS and BCS70. Possible factors which might mediate associations will also be assessed. The statistical methods and analysis plan for this part of the analysis are described in more detail here.

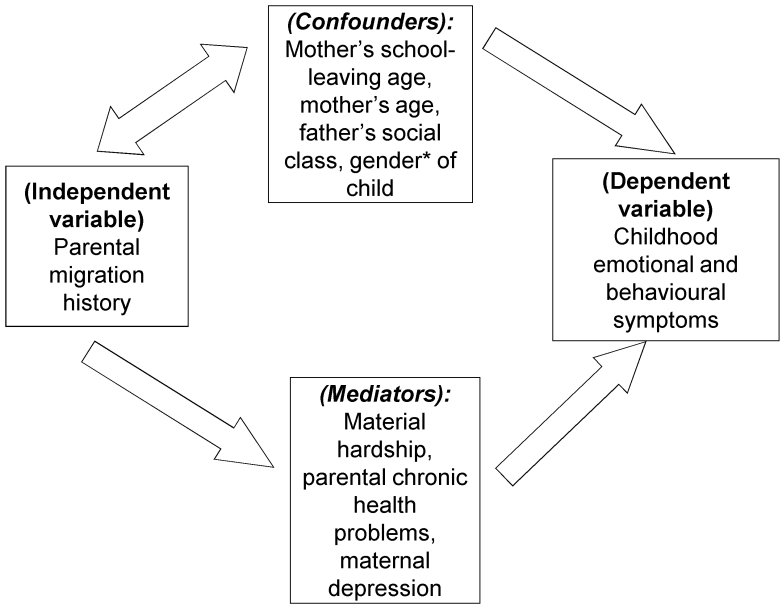
Analytic plan

For this part of the analysis psychological symptom 'count' at age 5, 10 and 16 in BCS70 and age 7, 11 and 16 in NCDS, as the main dependent variable, were assessed in second generation Irish children relative to non-Irish children, after adjusting for child's gender. Interactions of parental migration history with gender were also assessed. Where differences were evident, the role of potential 'mediating' factors in accounting

for any observed differences were assessed. Mediation was deemed to be present if: 1. There was an association between the main independent variable (in this case parental migration history) and dependent variable (childhood emotional and behavioural symptoms); 2. There was an association between the independent variable (parental migration history) and putative 'mediator'; 3. There was an association between putative mediator and dependent variable; 4. Once the putative mediator was added to models the association between independent variable (parental migration history) and dependent variable (childhood emotional and behavioural symptoms) was attenuated by the putative mediator [304].

Putative mediators assessed in models in NCDS, were the presence of parental chronic ill health and material hardship (entered into models as a composite variable derived through PCA- see below for a further description of this). In BCS70, the presence of maternal depression and material hardship were also assessed for their potential to attenuate any observed associations between being of second generation Irish descent and childhood psychological morbidity at age 5, 10, 16. Confounders for both sets of models were: Mother's age of leaving school, father's social class at birth, mother's age at birth and child's gender. Figure 6-3 schematically represents confounders and putative mediators in this association.

Figure 6-3: Analysis plan for childhood emotional and behavioural health problems

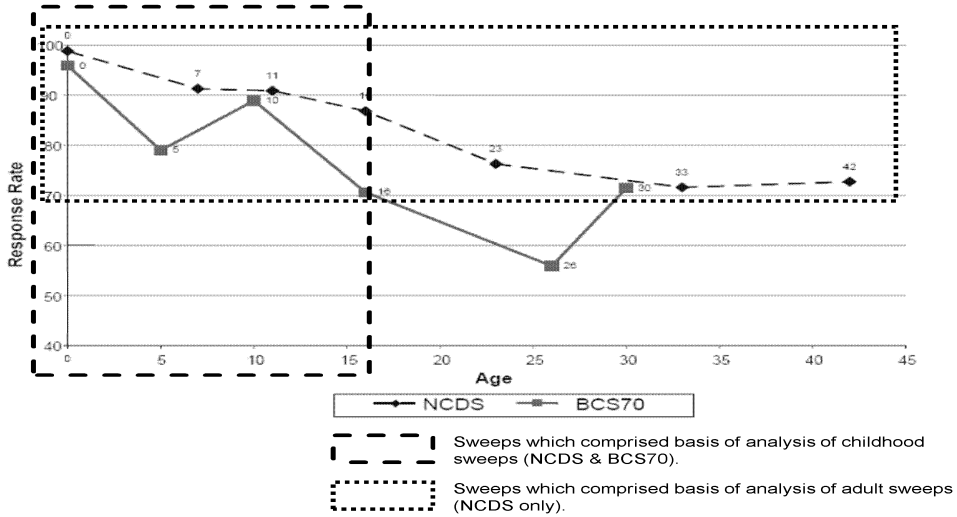


Key: **Gender was also assessed as an effect modifier of the 'parental migration history' & 'childhood emotional and behavioural symptoms' association*

Statistical Methods for analysis of childhood sweeps of NCDS & BCS70

All analyses were performed in STATA 10.1 IC [232]. Figure 6-4 shows attrition over time in both of the cohorts; Follow-up for NCDS was reasonable in childhood with overall response rates of: 85%, 83% and 78% at age 7, 11, and 16 (Table 6-1). In BCS70 the national teachers' strike reduced follow-up at age 16, although response rates were still 77%, 85% and 67% at the ages of 5, 10 and 16 respectively (Table 6-1). For this reason, the analyses of data from childhood sweeps of NCDS and BCS70 utilised a complete case approach, as response rates were thought to be, in general, good. For the later sweeps of NCDS the proportion of missing data was more marked, therefore alternative methods were used to minimise the risk of type 2 error for the later sweeps (discussed in more detail later, under section entitled '*Multiple imputation'*; p262).

Figure 6-4: Response rates in BCS70 and NCDS by age of cohort members[53]



[53] *This figure has been adapted from Plewis et al, 2004*

Data reduction of childhood material hardship variables through principal components analysis (PCA)

As Figure 6-1and Figure 6-2 illustrate, there were several variables available from the childhood sweeps of the two cohorts which enabled a detailed analysis of the material circumstances which second generation Irish children were born into and in which they spent their formative years living under. To assess the contribution of these material hardship variables in 'accounting for' (or mediating [304]) observed differences in childhood psychological health in Irish children relative to non-Irish children, Principal Components Analysis (PCA), specifying one component, was used to extract latent constructs for 'material adversity' [305]. This approach has the advantage of permitting the aggregation of more than one variable into a unidimensional construct[305]. Unlike approaches which sum variables (and therefore assign an equal weight to each of the variables comprising the summed measure), PCA assigns a greater weight to measures which are unequally distributed[305]- thus the inherent attractiveness of this approach in deriving a composite 'material hardship' variable which taps into social inequalities within the dataset.

Prior to factor analysis, the Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity were used and found to be adequate [306]. Values for the Kaiser-Meyer-Olkin measure of sampling adequacy range from 0 to 1; values closer to 1 are preferred, values of 0.6 are at the lower limit of acceptable [307]. In Bartlett's test of sphericity, a small p value suggests that there is evidence against the null hypothesis that the correlation matrix is an identity matrix.

In NCDS at ages 7, 11, and 16, following PCA, the first component accounted for 42%, 40%, and 40% of the total variance, respectively. In BCS70 at ages 5, 10 and 16, the first component accounted for 38%, 45% and 43% of the variance, respectively. The weights for each material hardship indicator were used to generate a composite hardship index for each of the sweeps in the two cohorts[305]. The variables entered into the PCA to derive the composite 'hardship' variable at each of the childhood sweeps in NCDS and BCS70, are listed in Table 6-8. Table 6-8 also shows mean scores (with standard deviations) on the composite hardship variables, according to parental

migration status. The distribution of the individual variables (that comprised the overall composite hardship variable), across Irish and non-Irish cohort members within the cohorts, is presented and discussed further in Chapter 4.

Table 6-8: Mean scores (with standard deviations) on composite hardship variables by parental migration status.

		Mean	SD	*Variables comprising composite hardship variable*
1958 British Birth Cohort				
Age 7				
Parents' COB	England, Scotland, Wales	-0.04	1.24	*Lack of access to one or more household amenities*, household overcrowding, family financial difficulties, family housing difficulties*
	Irish-born	0.58	1.66	
Age 11				
Parents' COB	England, Scotland, Wales	-0.04	1.25	*Lack of access to one or more household amenities*, household overcrowding, serious financial hardship in the last year, free school meals*
	Irish-born	0.37	1.43	
Age 16				
Parents' COB	England, Scotland, Wales	-0.05	1.23	*Lack of access to one or more household amenities*, household overcrowding, serious financial hardship in the last year, free school meals*
	Irish-born	0.47	1.52	
1970 British Birth Cohort				
Age 5				
Parents' COB	England, Scotland, Wales	-0.06	1.20	*Lack of access to 1+ household amenities*, household overcrowding, car/ van ownership, social rating of neighbourhood*
	Irish-born	0.42	1.23	
Age 10				
Parents' COB	England, Scotland, Wales	-0.06	1.32	*Car/ van ownership, damp in housing, free school meals, resident in council housing*
	Irish-born	0.61	1.52	
Age 16				
Parents' COB	England, Scotland, Wales	-0.01	1.3	*Car ownership, damp in housing, resident in council housing, unable to afford to heat whole house in winter*
	Irish-born	0.18	1.46	

Key: **Lack of sole access to any one of: indoor bathroom, hot water or indoor toilet. Composite hardship variables were derived through Principal Components Analysis*

Multivariate logistic regression

For binary measures multivariate logistic regression was used to assess associations between independent variables and dependent variables. This approach was used to assess the association of Irish-born parents either having depression (mothers in BCS70) or having a chronic health problem (NCDS). The composite hardship indicator variable was added to these models to assess if associations were either partially or fully attenuated by this variable.

Negative binomial regression (with and without zero inflation)

As described previously, the main dependent variable in NCDS and BCS70 was 'total childhood psychological symptom count', at each of the sweeps (age 5, 10, 16 in BCS70 and 7, 11 and 16 in NCDS). This variables was derived through summing scores on either the BSAG or the Rutter-A or Rutter-B, resulting in a total symptom 'count' for each child which participated in the survey. Examination of the summed distribution of symptoms indicated over-dispersion, with right skew (see figures in *Appendix A* displaying the distribution of symptom counts at each of the sweeps in the two cohorts). In order to deal with these distributional challenges, negative binomial regression with and without zero-inflation was used for analysis[308].

The underlying assumption of zero-inflated negative binomial regression is that the population comprises two groups, one which is 'certain zero' and one in which members have symptom counts≥0. The probability that an observed zero is part of the 'certain zero' part is modelled with a logistic regression, and the part of the model where counts≥0 is modelled with a negative binomial regression approach. Derived coefficients were exponentiated, leading to a 'Count Ratio' (CR) with 95% confidence intervals. Migration history and cohort member's gender were entered into the zero inflation parts of the model. The relative 'fit' of the models was checked using the *countfit* command in STATA[309], whereby the residuals of the two models (negative binomial regression versus negative binomial regression with zero inflation) were compared using fit statistics, which included the BIC, AIC, log-likelihood and Vuong

test. The decision to model the total symptom count at each of the sweeps with (or without) zero-inflation was governed by the results of these fit statistics.

Analytic plan and statistical analysis of mid-life common mental disorders and poorer self-rated health in NCDS

In Chapter 8 I will detail the results of analyses examining factors across the life-course in accounting for mid-life common mental disorders and poorer self-rated health in the NCDS. As this part of the analyses will involve the examination of the adult sweeps of the dataset a slightly different statistical approach will be taken, specifically to deal with missing data issues.

The next section will describe the analytic plan and statistical methods, which will be used to analyse the adult sweeps of the NCDS dataset.

Analytic plan

The dependent variables for this part of the analysis were mid-life common mental disorders and poorer self-rated health at mid-life (age 44/ 45). The prevalence of these outcomes was assessed in second generation Irish cohort members relative to non-Irish cohort members. The odds of screening positive for common mental disorders across the life-course prior to mid-life (at age 23 and 33) and of reporting poorer self-rated health (also at age 23 and 33) was also assessed in second generation Irish cohort members relative to non-Irish cohort members, using multivariate logistic regression. Models assessed interactions with gender and where no interactions were found gender was treated as a confounding variable in the association.

If differences in the prevalence of either mid-life common mental disorders or poorer self-rated health at mid-life were found, then, as described in the previous section, the possible contribution of these putative 'mediating' variables in accounting for differences in mid-life health in second generation Irish cohort members relative to non-Irish cohort members was assessed, using the approaches described previously [304]. Covariates were grouped according to timing of exposure (childhood, early adulthood, and mid-life) and according to 'type' of exposure (health-related behaviours, material

adversity, social adversity and prior poorer mental health or poorer self-rated health), and entered into models according to these 'groups of exposure'.

Statistical methods for analysis of adult sweeps of NCDS

Missing Data in the NCDS

As discussed in the previous section (entitled *'Statistical Methods for analysis of childhood sweeps of NCDS & BCS70'*; p254) analyses of the childhood sweeps of NCDS were completed through a complete case analysis method as response rates were reasonable to age 16 (Table 6-1). In adulthood response rates dropped further to 68%, 62% and 62% at age 23, 33 and 42, respectively (Table 6-1). In the biomedical sweep (age 44/ 45) complete data was available for responses to the CIS-R for 9297 individuals, which was 99% of the biomedical sample, and complete data was available on the question asking after self-rated health in 9115 individuals (97% of the biomedical sample). Figure 6-4 displays overall response rates for NCDS and BCS70 and highlights the large drop in response especially from age 16 to age 23 in NCDS when the respondent to the survey changed from parent/ carer to cohort member [310].

Overview of potential missing data mechanisms

Broadly, three different mechanisms of 'missingness' may be described, according to the classification originally proposed by Rubin [311, 312]. These are 'Missing Completely At Random' or MCAR, 'Missing At Random' or MAR, and 'Missing Not at Random' (MNAR)[311, 312]. MCAR refers to situations where data is missing due to a purely random phenomenon [313]. MCAR may have been applicable to the instance of the teacher's strike which adversely impacted on response rates at the age 16 sweep of BCS70[54].

MAR refers to situations where the missing data forms a random subset of the data which is observed, and which may be predicted from other (and in the case of longitudinal data- earlier) covariates. As a further subdivision, it has been suggested that

[54] Personal communication, Professor Amanda Sacker (UCL)

MAR may be differentiated as 'covariate-dependent Missing At Random' (MAR-CD), whereby missing responses may be due to other covariates within the dataset but not on the dependent variable (outcome)[55]. In contrast MAR may be observed if attrition within the dataset is due to known covariates and to the outcome of interest prior to dropout[5]. An example of this might be in the case of NCDS where people who were previously depressed (e.g. at earlier adult sweeps) were more likely to drop out, but the reason for drop-out was not due to being *currently* depressed (main outcome of interest in this example) [55].

MNAR occurs when the reasons for 'missingness' are related to both the outcome and to 'R', (R is the binary variable which reflects missing data status; 0=missing 1=observed)[314]. MNAR is a serious form of missing data as we cannot observe the outcome and therefore cannot know the relationship between the mechanism for missingness and outcome (i.e. the relationship between Y and R)[314].

Multiple imputation

In many instances of missing data, an assumption of MAR may be imposed if the distribution underlying the missing data is unknown[315]. It has been suggested that the only way to assess if the assumption of MAR is supported in a dataset is by obtaining follow-up data from study non-responders[315]. In practice (particularly in longitudinal studies where missing data tends to follow a monotonic pattern) this is difficult or impossible to do. It has been suggested that assuming MAR in these instances- even if in reality there are departures from the underlying MAR assumption, has only a negligible impact on derived estimates and standard errors[315].

Therefore, for the analyses conducted in this thesis, an assumption which will underpin imputation analyses is that exposures with missing data are missing at random

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[55] An example of covariate dependent MAR (MAR-CD would be a study where older people did not attend for interview, but the reason for their non-attendance was due to their age (which is observed within the study) and not because of the outcome of interest (eg. health) (from ref 313. Tilling, L., *Missing Data* on Advanced Epidemiological and Statistical Methods Short Course, Bristol. (Lecture notes and personal communcation), 2010.)

(MAR)[316]. That is, for each variable that is missing data, it might be possible to impute missing values using other predictor variables from within the dataset. Missing values were imputed using the chained equations approach ('ICE') in STATA 10 [232, 317].

The assumption underlying multiple imputation for missing data is that the missing data mechanism is MAR. Multiple imputation (MI) is fast becoming the method of choice in dealing with missing data [318], particularly with recent improvements in software and processing speed. MI through the *ICE* procedure in *STATA* produces multiple estimates for each missing data point, based on observed data, using the chained equation approach [316-318]. MI models include variables which predict missing values in main analysis models. The estimates are then combined using Rubin's rules[56] to produce an overall estimation of association [319]. The combined estimates command takes into account standard errors for 'missing data uncertainty' [316].

Steps taken in imputing data using ICE for the NCDS dataset

For analyses examining the dependent variables of mid-life common mental disorders and poorer self rated health at age 44/ 45 (see chapter 5) a common imputation regression equation for both dependent variables was used, as most of the covariates, interactions, and predictors of missingness in the two models were identical. Prior to imputation, all cases who had died by the time of the biomedical sweep were removed from the dataset[316].

In order to maximise the assumption that the underlying mechanism of missingness was MAR, prior to analysis missing data patterns were checked in the dataset using the *mvpatterns* command in STATA[318], and variables known to strongly predict missingness or attrition were included in the imputation regression model [217]. Prior

[56] Rubin's Rules dictate the types of estimates which can and can't be combined in the post-estimation phase of a multiply imputed dataset. Statistics that assess strength of evidence and which are reliant on 'n' should not be used. This includes Likelihood Ratio Tests, model chi-squared tests or Z tests. Wald tests can be used on combined estimates to assess strength of evidence instead.

analysis of the NCDS has suggested that mother's education, and region of birth in Wales [263], as well as occupation and education at age 33 [88, 120], predict attrition, and so these variables were included in the imputation regression equation (even though they were not analysed in substantive models). Inclusions of these variables, and others known to predict attrition or missingness of covariates in the substantive model made the '*assumptions of MAR more plausible'* [217]. In addition all variables to be included in substantive analytic models were included in the imputation equations, many of these also predicted attrition in mid-life, or predicted missingness on covariates forming the basis of the analysis. Variables to be included in the imputation regression equation were encoded as either binary, categorical, or ordinal, as this avoided the problem of imputing non-normally distributed continuous variables. For summed scales, especially those with specific psychometric properties relating to pre-validated or widely accepted cut-points (this included the AUDIT, CAGE, CIS-R, Malaise Inventory, Bristol Social Adjustment Guide, Rutter-B, and the Close Person's Questionnaire), variables were entered into the imputation regression models categorised at these cut-points[57].

A common pitfall in multiple imputation is to specify a imputation equation where "*the analysis procedure does not correspond to the imputation model*" , this has been referred to as an 'uncongenial model' [320]. This situation arises in multiple imputation if the outcome is incorrectly omitted from imputation models [316, 321], or where the imputation fails to allow for interactions which the investigator is interested in, for substantive models [316]. The net effect of this on the analyses would be to reduce the size of coefficients (in the case of an association between a independent and an independent variable) towards the null (or '*falsely weaken the association'* [321]); or, in the case of a multiplicative interaction, to reduce the strength of the evidence for the interaction[316]. It has been suggested that if the investigator's main concern is not the

[57] Personal communication from Patrick Royston 14th April 2011 on '*Practical use of multiple imputation to handle missing data'* course in Cambridge: All of these scales tended to be skewed (and not normally distributed) therefore entering them into the imputation regression may have resulted in a different distribution of scores post-imputation. In this instance it is advisable to dichotomise variables at pre-defined/ validated cutpoints prior to imputation in order to preserve the psychometric properties of the scale in the imputed data.

interaction (but instead interactions are only being 'checked for' in models) then an uncongenial model may be tolerated, however if interactions are a primary concern then these need to be accurately specified in the imputation equation to ensure congeniality[58]. In the case of the present analyses interactions with gender were specified using a congenial model. The decision to ensure congeniality was taken as the literature suggests some differences in the health of Irish men and women (See Chapter 2).

Following multiple imputation, multivariate logistic regression analysis was performed using the *mim* command in STATA [316]. This command combines estimates using Rubin's Rules [316]. For the analyses, models were restricted to cases who had complete data on dependent variables, to minimise 'noise' in the final estimates [316]. 9377 cohort members provided data at the biomedical sweep (age 44/45). Excluding migrants and children with parents not born in England, Scotland, Wales, Ireland or Northern Ireland, analyses were therefore performed on 8403 individuals providing complete information on the CIS-R, and on 8243 individuals providing a response to the question on self-rated health, at mid-life.

Determining the number of imputation cycles ('m') and use of the Monte Carlo error to assess stability in derived estimates from imputations

During the process of multiple imputation multiple copies of the original dataset are created, with missing values 'filled in'. This 'filling in' process uses all other observed data within the dataset using a Bayesian approach whereby the 'predictive distribution' derived from observed data is used [321]. As Sterne and colleagues suggest, "*the imputation procedure must fully account for all uncertainty in predicting the missing*

[58] Personal communication: Ian White, 14th April 2011 on 'Practical use of multiple imputation to handle missing data' course in Cambridge. For interaction terms the 'passive' function in ICE needs to be used to specify each interaction term. To ensure congeniality three separate interactions need to be entered into the regression model for imputation. Where the interaction in the substantive regression model is expressed as: independent variable[1]*independent variable[2] with dependent variable, this should be expressed in the imputation regression as: 1. Interaction of dependent variable with independent variable[1]; 2. Interaction of dependent variable with independent variable[2]; 3. Interaction of independent variable [1] with independent variable [2]. An uncongenial model would be where only the interaction of the two independent variables ([1] and [2]) are expressed in the regression equation for the multiple imputation.

values by injecting appropriate variability into the multiple imputed values; we can never know the true values of the missing data"[321]. Thus, the derived standard errors of estimates from analyses of imputed data should reflect the degree of uncertainty of the imputation procedure [317, 318].

Previously, it was recommended that five imputation cycles would be sufficient for multiple imputation[316], however more recent commentary has suggested that a greater number of imputation may be required[316]. White and colleagues suggest that failing to have an adequate number of imputation cycles, which should be proportional to the proportion of missing data, risks leading to analyses which give varying estimates and thus impact on the reproducibility of regressions performed on imputed data [316]. They suggest that the number of imputation cycles chosen should reflect the proportion of missing data within the sample, with a 'rough rule of thumb' suggesting '*m*' cycles as equivalent to the proportion of missing data[316][59]. Imputation regression output commonly displays an 'FMI' ('Fraction of Missing Information') which can be used to assess if the number of imputation cycles have been adequate.

After running a regression model where the analyst believes they have used a dataset with an adequate number of imputation cycles, it is also possible to check the potential reproducibility of the findings by using a post-estimation assessment of models, in the form of Monte Carlo errors [316][60]. The Monte Carlo error is defined as "*the standard deviation* (of results*) across repeated runs of the same imputation procedure with the same data*"….with "*the Monte Carlo error (tending) to zero as m increases*." [316]. Therefore for maximal reproducibility, Monte Carlo error should be as small as

[59] Eg. if a variable is missing 17% data then 17+ imputations should be performed (m=20 would be a reasonable response to this situation) see *White et al, 2011*316. White, I.R., P. Royston, and A.M. Wood, *Multiple imputation using chained equations: Issues and guidance for practice.* Statistics in Medicine 2011. **30**(4): p. 377-399.

[60] Also covered on missing data course in MRC Biostatistics unit, April 2011.

possible. It has been suggested that if the Monte Carlo Error from derived estimates raises concern[61] then a greater number of imputation cycles may be required[316].

[61] Various 'rules of thumb' have been suggested for interpreting the Monte Carlo Error. See *White, Royston & Wood 2010* for more detail.

7 Born into adversity: Psychological distress in two birth cohorts of second generation Irish children growing up in Britain

Introduction

As discussed in previous chapters of this thesis there is a large literature documenting health disadvantages across generations of Irish-descended people in Britain [9, 10]. These have defied obvious explanations as health inequalities have persisted despite improvements in socioeconomic position across generations[9, 10]. As discussed in Chapter 2, similar observations have been noted for other migrant groups living in Britain and in Europe[24, 25, 28]. Chapter 3 highlighted a rich vein of research linking experiences over the life-course (in particular material and social disadvantage and 'psychosocial factors') to later down-stream health outcomes as diverse as common mental disorders, health-related behaviours, and ultimately mortality. In Chapter 4, I presented evidence linking migration to social mobility and common mental disorders; however, the scarcity of work on second generation ethnic minority groups presented in this chapter was stark. Perhaps a close parallel to this latter observation is the obvious gap in the literature around empirical evidence linking the life-course to migration, in accounting for health inequalities in second generation ethnic minority groups; much previous work has focused on first generation migrant groups. In other words, although there have been studies in which childhood psychological health has been examined in ethnic minority children[262], a limitation has been in the absence of work specifically linking the experiences of settlement of migrant families and related to this, parental health, with childhood emotional and behavioural problems in second generation ethnic minority children. The example of second generation Irish children growing up in Britain therefore provides an informative case study on migration, settlement, and the intergenerational factors that might account for poorer health in ethnic minority and migrant groups to Britain, especially as the literature reviewed in Chapter 2 suggested

that Irish-born parents would have been more likely to have suffered physical and mental health problems and have also been more likely to have settled in more adverse socioeconomic circumstances[62], at least on initial arrival to Britain.

In the following chapter I will present data from two British birth cohorts (1958 and 1970), each of which had significant populations of second generation Irish boys and girls, defined as having been born in England, Scotland and Wales to Irish-born parents. In the analyses presented here I will examine the material and psychosocial circumstances of children growing up during these two time periods. As discussed in Chapter 2, there have been very few previous studies examining childhood emotional and behavioural health in second generation Irish children. A relative strength of the analyses presented here is that they will be based on prospective data from two nationally representative birth cohorts separated by more than a decade. The prospective nature of the dataset will help to minimise recall bias, the national representativeness of the two cohorts will improve generalisability and the two cohorts separated by more than a decade will mean that findings can be interpreted across two different time periods allowing a narrative assessment of potential period effects. A further strength is that response rates were good across all of the sweeps presented in this chapter.

I chose, first, to make a detailed enquiry into childhood as I felt that this period might have particular relevance to health inequalities in adulthood in Irish cohort members. As was suggested through the literature reviews in Chapter 3, childhood may represent an important 'sensitive' period with experiences of adversity continuing to have long-range effects on health, many years later. The purpose of the present chapter is therefore to present a detailed enquiry into the material and social circumstances in which second generation Irish children grew up, whether born in 1958 or in 1970, relative to children growing up in Britain at these times who did not have a parental history of migration.

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[62] Although an exception to this might have been Irish women coming to Britain to take up training and relatively well paid employment in nursing, with tied accommodation (Winston, 2000).

In addition, using the data presented here, it will be possible to examine potential mechanisms (in particular 'intergenerational' mechanisms) that might account for any psychological health inequalities between second generation Irish children and children of British born parents. This addresses another gap in the literature, as, while there have been many studies that have reported on the mental health of ethnic minority children, few have examined potential aetiological *mechanisms* that might account for any observed health inequalities[262].

The following two hypotheses will be tested in this chapter:

1. Children of Irish-born migrants are more likely to have a higher prevalence of psychological distress, relative to non-migrant children.

2. An excess in psychological morbidity in children of Irish-born parents compared to British-born parents will be explained by parental social and health inequalities.

Methods

The analyses presented in this section focused solely on data which was collected in the childhood sweeps of NCDS (age 7, 11 and 16) and BCS70 (age 5, 10, 16). As response rates (particularly in NCDS) for the childhood sweeps of the cohort were good, the data presented here have not been imputed. Instead all of the analyses presented are complete case analyses. A full description of material adversity variables assessed in childhood is described in Chapter 6. Principal Components Analysis was used to derive a composite 'hardship variable' across the childhood sweeps of both cohorts (see Chapter 6 '*Methodology'* for a description of this). Different scales were used to assess childhood psychological health in the BCS70 and NCDS. These were the Bristol Social Adjustment Guide, Rutter-A and Rutter-B. For all of these scales, higher summed scores indicated a higher likelihood of emotional or behavioural problems [268, 271, 272, 275]. These instruments are described in more detail in Chapter 6.

To ensure comparability of scales across BCS70 and NCDS, scores on each scale were summed. The distribution of the scores was highly skewed, and in some cases had a preponderance of zeros[63] , therefore for this part of the analysis negative binomial regression with zero-inflation was used; this is described in more detail in the Statistical Methods section of Chapter 6. As described in Chapter 6, the role of putative mediators was assessed by adding mediators to models and then assessing for the attenuation of main associations between exposures and outcomes.

Results

Demographic information

6% of participants were of second generation Irish descent in both cohorts. 52% of the sample from NCDS were male (n=8673), as were 52% of BCS70 (n=7732). In NCDS, some cohort members were missing information on parental origins either due to not being present at the sweeps when this question was asked (age 11 and 16) (n=2038), or

[63] See Appendix A

being present but not responding (n=1003). Of the 3041 cohort members missing this information, 27% (n=835) had died, and 20% (n=603) had emigrated, by age 16 (Table 7-1). Reasons for non-response were broadly equivalent between second generation Irish cohort members and the rest of the sample. Children missing information on parental country of birth were more likely to return incomplete information in general, as these children were missing due to attrition (Table 7-3).

In BCS70, 737 children were missing information on parents' country of birth, of whom the majority (97%) were not present at sweep 0, when this question was asked (Table 7-2). In addition, Irish cohort members were more likely to be missing information at sweeps 1-3 due to 'refusal' or 'other' reasons (Table 7-2). In BCS70, children missing information on parental origins were more likely to return incomplete information for gender, social class at birth, and tenure at age 5 (Table 7-4). However gender profiles and tenure profile (including proportions missing data) at age 16 were broadly equivalent between the two groups (Table 7-4).

Table 7-1: Reasons for non-response across sweeps, NCDS

	Country of birth (COB) of cohort members' parents					
	Both parents born in England, Scotland or Wales		One or both parents born in Ireland/ N. Ireland		No information on COB of cohort member's parent*	
N (%)	**12933**	**(%)**	**791**	**(%)**	**3041**	**(%)**
Sweep 0 (birth)						
some data	12769	99%	782	99%	3002	99%
no data/ other contact later	164	1%	9	1%	39	1%
Sweep 1 (Age 7)						
some data	12144	94%	710	90%	1404	46%
no data (dead)	0	0%	0	0%	812	27%
no data (emigrant)	94	1%	10	1%	353	12%
No data (refusal/ other)	695	5%	71	9%	472	16%
Sweep 2 (Age 11)*						
some data	12447	96%	761	96%	707	23%
no data (dead)	0	0%	0	0%	829	27%
no data (emigrant)	68	1%	6	1%	586	19%
No data (refusal/ other)	418	3%	24	3%	919	30%
Sweep 3 (Age 16)*						
some data	11729	91%	699	88%	710	23%
no data (dead)	24	0%	1	0%	835	27%
no data (emigrant)	90	1%	18	2%	603	20%
No data (refusal/ other)	1090	8%	73	9%	893	29%

Table 7-2: Reasons for non-response across sweeps, BCS70

	Country of birth (COB) of cohort members' parents					
	Both parents born in England, Scotland or Wales		One or both parents born in Ireland/ N. Ireland		No information on COB of cohort member's parent*	
N (%)	**14022**	**(%)**	**832**	**(%)**	**737**	**(%)**
Birth*						
some data	14022	100%	832	100%	21	3%
no data (refusal/ other)	0	0%	0	0%	716	97%
Sweep 1 (Age 5)						
some (data)	11147	79%	544	65%	257	35%
no data (dead)	474	3%	31	4%	3	0%
no data (refusal/ other)	2401	17%	257	31%	477	65%
Sweep 2 (Age 10)						
some data	12013	86%	563	68%	685	93%
no data (dead)	490	3%	31	4%	3	0%
no data (refusal/ other)	1519	11%	238	29%	49	7%
Sweep 3 (Age 16)						
some data	9502	68%	388	47%	540	73%
no data (dead)	498	4%	31	4%	4	1%
no data (refusal/ other)	4022	29%	413	50%	193	26%

***Key**: *This information was missing either because the cohort member was not present when this question was asked (at birth in BCS70), or because parents were present but a response was not encoded.*

Table 7-3: Characteristics of cohort members missing information on parental country of birth in NCDS.

Excludes children known to have died or emigrated by age 16

	Information on parental COB available		No information on parental COB available		χ^2; p value
	N	(%)	N	(%)	
Gender					
male	7385	51%	836	52%	χ^2=0.61;p=0.44
female	7059	49%	767	48%	
Social class at birth					
I-II	2346	16%	291	18%	χ^2=55.29; p<0.001
III	8197	57%	828	52%	
IV-V	3014	21%	314	20%	
sick/dead/retired/ student/no male head/ no answer*	703	5%	131	8%	
missing	184	1%	39	2%	
Tenure, age7					
owner occupied	5409	37%	388	24%	χ^2=1.2e^3; p<0.001
council rented	5262	36%	341	21%	
private rented	1554	11%	141	9%	
rent free	298	2%	14	1%	
other	993	7%	231	14%	
missing	928	6%	488	30%	
Tenure, age 16					
owner occupied	5494	38%	3	0%	χ^2=3.9e^3; p<0.001
council	4612	32%	9	1%	
private rented	561	4%	0	0%	
tied	414	3%	0	0%	
other	41	0%	1	0%	
missing	3322	23%	1590	99%	

Key: **In the 'single/ no male head/ no answer' category there were only 25 children with parents of known COB and 2 children with parents of unknown COB; hence this category was combined with the 'sick/ dead/ retired/ student' category*

Table 7-4: Characteristics of cohort members missing information on parental country of birth in BCS70.

Excludes children known to have died or emigrated by age 16

	Information on parental COB available		**No information on parental COB available**		**χ^2; p value**
	N	**%**	**N**	**%**	
Gender					
male	7733	52%	378	51%	χ^2=7.42; p=0.02
female	7115	48%	357	48%	
missing	6	0%	2	0%	
Social class at birth					
I-II	2326	16%	1	0%	χ^2=1.4e^4; p<0.001
IIINM	1717	12%	2	0%	
IIIM	6758	45%	6	1%	
IV	1996	13%	1	0%	
V	913	6%	1	0%	
other/ unsupported	1070	7%	6	1%	
missing	74	0%	720	98%	
Tenure, age 5					
owner/occupier/ being bought	6531	44%	142	19%	χ^2=769.36; p<0.001
private rented	691	5%	20	3%	
council	3913	26%	74	10%	
other	566	4%	19	3%	
missing	3153	21%	482	65%	
Tenure, age 16					
owner occupier	3578	24%	178	24%	χ^2=4.43; p=0.35
private rented	131	1%	4	1%	
council	738	5%	48	7%	
other	86	1%	4	1%	
missing	10321	69%	503	69%	

At age 16 there was a similar tenure profile in children missing information on parental origins and children not missing this information in BCS70 (Table 7-4).

Response rates for the NCDS were good, with 83% of all living cohort members providing data at age 16. The response rate at age 16 in BCS70 was reduced by the national teachers' strike[264] and was about 69% of those children who were still alive.

Indicators of childhood adversity

The following tables show that at each sweep of both cohorts, second generation Irish children grew up under conditions of marked material adversity compared to British non-migrant children.

Sole access to amenities became more equivalent in the two groups over time in the NCDS although by age 16 (1974) second generation Irish cohort members remained more likely to receive free school meals, live in overcrowded housing and report serious financial hardship in the previous year (Table 7-7). Conditions relating to damp housing also became more equivalent in the two groups by age 16 in BCS70 (Table 7-7).

As expected, mean scores on the composite hardship variable, derived through PCA, were also greater in Irish children (see *Table 6-8: Mean scores (with standard deviations) on composite hardship variables by parental migration status.; p258*). A complete description of how this composite variable was derived is described in full in Chapter 6 (*see p256 'Data reduction of childhood material hardship variables through principal components analysis (PCA)'*).

Table 7-5: Childhood adversity in 2nd generation Irish children relative to the rest of the cohort; Age 5 (NCDS) & age 7 (BCS70)

1958 Birth Cohort; n=13,724						1970 Birth cohort; n=14,854					
Country of birth of parent:	**England, Scotland, Wales**		**N. Ireland, Ireland**		**x^2; p value**	**Country of birth of parent:**	**England, Scotland, Wales**		**N. Ireland, Ireland**		**x^2; p value**
	N	**(%)**	**N**	**(%)**			**N**	**(%)**	**N**	**(%)**	
Access to household amenities						**Access to household amenities**					
sole use of all [a]	9535	82%	502	75%	x^2=23.42;	sole use of all [a]	10372	95%	492	93%	x^2=6.74;
none /shared use [a]	2047	18%	168	25%	p<0.001	none or shared use [a]	495	5%	37	7%	p=0.009
Missing	1351		121			Missing	3155		303		
Overcrowding						**Overcrowding**					
<1 person/ room	6576	59%	246	39%	x^2=91.16;	<1 person/ room	9245	84%	384	72%	x^2=50.34;
>1 person/ room	4646	41%	381	61%	p<0.001	>1 person/ room	1788	16%	149	28%	p<0.001
Missing	1711		164			Missing	2989		299		
Family financial difficulties						**Ownership of van / car**					
no	9628	92%	491	83%	x^2=65.74;	Yes	7978	71%	322	59%	x^2=38.45;
yes	822	8%	103	17%	p<0.001	No	3189	29%	223	41%	p<0.001
Missing	2483		197			Missing	2855		287		
Family housing difficulties						**Social rating of neighbourhood**					
no	10296	93%	535	84%	x^2=70.90;	Well-to-do/ affluent	2585	18%	71	9%	x^2= 179.85;
yes	763	7%	101	16%	p<0.001	Rural/ average	7588	54%	370	44%	p<0.001
						Poor	654	5%	84	10%	
Missing	1874		155			Missing	3195		307		

Key *[a] Household amenities were: indoor bathroom, indoor toilet and hot water*

Table 7-6: Childhood adversity in 2nd generation Irish children relative to the rest of the cohort; Age 11 (NCDS) & age 10 (BCS70)

1958 Birth Cohort; n=13,724						1970 Birth cohort; n=14,854					
Country of birth of parent:	**England, Scotland, Wales**		**N. Ireland, Ireland**		**x^2; p value**	**Country of birth of parent:**	**England, Scotland, Wales**		**N. Ireland, Ireland**		**x^2; p value**
	N	**(%)**	**N**	**(%)**			**N**	**(%)**	**N**	**(%)**	
Access to household amenities						**Ownership of van/ car**					
sole use of all [a]	10265	88%	594	85%	x^2=4.17;	Yes	8415	76%	286	57%	x^2=97.03;
none /shared use [a]	1391	12%	101	15%	p=0.041	No	2642	24%	218	43%	p<0.001
Missing	1277		96			Missing	2965		328		
Overcrowding						**Neighbourhood characteristics**					
<1 person/ room	7256	62%	318	46%	x^2=70.50;	Village/ rural	7134	65%	216	43%	x^2=100.42;
>1 person/ room	4494	38%	377	54%	p<0.001	Council/Urban/Other	3925	35%	291	57%	p<0.001
Missing	1183		96			Missing	2963		325		
Serious financial hardship in the last year						**Damp in housing**					
No	10196	89%	553	84%	x^2=20.57;	No	9179	82%	402	78%	x^2= 6.85;
Yes	1231	11%	109	16%	p<0.001	Yes	1978	18%	115	22%	p=0.009
Missing	1506		129			Missing	2865		315		
Free school meals						**Free school meals**					
No	10284	90%	564	83%	x^2=34.83;	No	9463	85%	383	75%	x^2=34.94;
Yes	1113	10%	114	17%	p<0.001	Yes	1678	15%	126	25%	p<0.001
Missing	1536		113			Missing	2881		323		

Key *[a] Household amenities were: indoor bathroom, indoor toilet and hot water*

Table 7-7: Childhood adversity in 2nd generation Irish children relative to the rest of the cohort; Age 16 (NCDS & BCS70)

1958 Birth Cohort; n=13,724						1970 Birth cohort; n=14,854					
Country of birth of parent:	**England, Scotland, Wales**		**N. Ireland, Ireland**		**x^2; p value**	**Country of birth of parent:**	**England, Scotland, Wales**		**N. Ireland, Ireland**		**x^2; p value**
	N	**(%)**	**N**	**(%)**			**N**	**(%)**	**N**	**(%)**	
Access to household amenities						**Ownership of van/ car**					
sole use of all [a]	9179	94%	527	94%	x^2=0.00;	No	1171	16%	61	24%	x^2=11.83;
None/shared use [a]	609	6%	35	6%	p= 0.996	Yes	6060	84%	189	76%	p=0.001
Missing	3145		229			Missing	6791		582		
Overcrowding						**Resident in council flat**					
<1 person/ room	6813	70%	294	52%	x^2=77.12;	No	3675	84%	120	77%	x^2=5.48;
>1 person/ room	2981	30%	272	48%	p<0.001	Yes	702	16%	36	23%	p=0.019
Missing	3139		225			Missing	9645		676		
Serious financial hardship over the last year						**Damp in home**					
no	8729	90%	461	82%	x^2=34.35;	No	6564	90%	229	90%	x^2=0.08;
yes	949	10%	98	18%	p<0.001	Yes	702	10%	26	10%	p=0.777
Missing	3255		232			Missing	6756		577		
Free school meals						**Proportion of home family can afford to heat in winter**					
no	8869	91%	469	83%	x^2=40.13;	Proportion of house	5288	67%	167	59%	x^2=9.21;
yes	911	9%	99	17%	p<0.001	Whole house	2556	33%	117	41%	p=0.002
Missing	3153		223			Missing	6178		548		

Key *[a] Household amenities were: indoor bathroom, indoor toilet and hot water*

Parental health

In NCDS, Irish-born parents were more likely to report a chronic health condition, when their child was aged 11 or 16 (Table 7-8). This difference was reduced, and strengths of associations diminished, when material adversity indicators were taken into account. In BCS70, there was strong evidence to suggest that Irish-born mothers were more likely to be psychologically distressed when their child was 5 or 10 years with a suggestion for increased risk at age 16 also. When indicators for material hardship were taken into account, this excess risk was reduced and strength of associations diminished (Table 7-9).

Table 7-8: Health of Irish-born parents in NCDS when child was aged 11 or 16

	Non-Irish parents		**Irish-born parents**		***Association with chronic illness in Irish-born parents relative to parents in rest of cohort***				***Association with chronic illness in Irish-born parents relative to parents in rest of cohort, adjusted for hardship***			
					Model 1				**Model 2**			
	N (%)		**N (%)**			**OR**	**(95% CI)**	**p value**		**OR**	**(95% CI)**	**p value**
No chronic illness	9077	79%	517	74%	Non-Irish parents	1.00	ref		Non-Irish parents	1.00	ref	
One or more chronic illness	2359	21%	177	26%	Irish-born parents	1.35	1.08,1.70	0.01	Irish-born parents	1.09	0.86,1.38	0.48
Missing data	*1497*		*97*						Hardship, 11*	1.33	1.25,1.42	p<0.001[t]
									Hardship, 16*	1.33	1.25,1.42	p<0.001[t]

Key: *[*] per SD increase in composite hardship indicator; [t] trend*

Table 7-9: Psychological health of Irish-born mothers (BCS70)

	Non-Irish mothers		**Irish-born mothers**		**Model 1:** *Psychological distress in Irish-born relative to non-Irish mothers*				**Model 2:** *Psychological distress in Irish-born relative to non-Irish mothers, adj for hardship*			
	N	**(%)**	**N**	**(%)**		**OR**	**(95% CI)**	**p value**		**OR**	**(95% CI)**	**p value**
Age 5 (1975)												
Not distressed	7241	83%	316	77%	Non-Irish mother	1.00	ref		Non-Irish mother	1.00	Ref	
Psychologically distressed*	1508	17%	97	23%	Irish-born mother	1.43	1.12,1.83	p<0.001	Irish-born mother	1.23	0.95,1.58	0.11
Missing data	5273		419						Hardship**	1.57	1.49,1.66	p<0.001[t]
Age 10 (1980)												
Not distressed	6646	81%	269	75%	Non-Irish mother	1.00	ref		Non-Irish mother	1.00	ref	
Psychologically distressed*	1556	19%	91	25%	Irish-born mother	1.43	1.11,1.83	0.01	Irish-born mother	1.13	0.88,1.47	0.34
Missing data	5820		472						Hardship**	1.67	1.59,1.76	p<0.001[t]
Age 16 (1986)												
Not distressed	4780	83%	153	80%	Non-Irish mother	1.00	ref		Non-Irish mother	1.00	ref	
Psychologically distressed*	975	17%	38	20%	Irish-born mother	1.53	0.86,2.74	0.15	Irish-born mother	1.46	0.80,2.64	0.21
Missing data	8267		641						Hardship**	1.50	1.37,1.64	p<0.001[t]

*Key: *Rutter Malaise inventory scores in top 20th centile; :*per SD increase in composite hardship indicator; [t]trend;*

Mental health in childhood

The Count Ratio (CR) for psychological symptom scores in second generation Irish children relative to non-Irish children, in both cohorts, is displayed in the following table (Table 7-10). After adjusting for gender, second generation Irish children had a higher psychological symptom count at age 5 and 11 in NCDS, and at age 16 in both cohorts (Table 7-10). No interactions with gender were noted.

Table 7-10: Psychological health in second generation Irish children, relative to the rest of the cohort

NCDS (1958 British Birth Cohort)					
Age	**Year**	**N**	**CR**[a]	**95% CI**	**p value**
Age 7	1965	12486	1.11	1.02,1.20	0.01
Age 11	1969	12244	1.09	1.00,1.19	0.05
Age 16	1974	9906	1.23	1.10,1.39	<0.001
BCS70 (1970 British Birth Cohort)					
Age	**Year**	**N**	**CR**[a]	**95% CI**	**p value**
Age 5	1975	11168	1.02	0.96,1.07	0.57
Age 10	1980	10980	1.04	0.99,1.09	0.16
Age 16	1986	6769	1.15	1.01,1.31	0.03

Key

[a] *Count Ratio: Psychological symptom count in Irish children relative to rest of cohort. Models have been adjusted for gender only*

.

Table 7-11, Table 7-12 and Table 7-13 display the differences in psychological symptom counts in Irish compared to non-Irish children in NCDS, after adjusting for covariates. Adjusting for material hardship significantly reduced the excess psychological symptom count ratio in Irish children, at age 7 and 16 (Table 7-11; Table 7-12), whereas adjusting for parental chronic illness had a modest effect on associations (Table 7-13).

At age 11 in NCDS, complete case analysis reduced the totals available for analysis to n=10741. Adjusting for gender, second generation Irish children had a psychological symptom count 1.06 times greater than non-Irish children (95% CI: 0.96 to 1.16). Accounting for variables from birth, contemporaneous material hardship, or poorer parental health did not change the coefficient for association greatly (Table 7-12). In BCS70, after adjusting for maternal psychological distress and covariates from birth, second generation Irish children had a psychological symptom count 0.78 times less than non-Irish children (95% CI: 0.62 to 1.00) (Table 7-14).

Table 7-11: Psychological symptoms in second generation Irish children relative to rest of cohort; 1958 British birth cohort, age 7 (1965) n=9949

	Model 1			Model 2			Model 3		
	CR [a]	**(95% CI)**	**p value**	**CR [a]**	**(95% CI)**	**p value**	**CR [a]**	**(95% CI)**	**p value**
Second generation Irish (vs. non-Irish)	1.11	1.01,1.22	0.03	1.10	1.00,1.21	0.04	1.05	0.96,1.15	0.29
Female (vs. male)	0.72	0.69,0.75	p<0.001	0.72	0.69,0.75	p<0.001	0.71	0.69,0.74	p<0.001
Mother's age (years)	-	-	-	0.99	0.99,1.00	p<0.001[t]	1.00	0.99,1.00	0.01[t]
Mother left school before 15	-	-	-	1.16	1.10,1.22	p<0.001	1.12	1.06,1.18	p<0.001
Manual social class (father)	-	-	-	1.22	1.16,1.28	p<0.001	0.86	0.82,0.90	p<0.001
Hardship, 7[b]	-	-	-	-	-	-	1.13	1.10,1.15	p<0.001*

Key: *Model 1: Adjusted for gender; Model 2: Adjusted for gender, covariates from birth (mother's age, education, father's social class); Model 3: Adjusted for gender, covariates from birth (mother's age, education, father's social class) and contemporaneous material hardship;* [a] *Count Ratio (CR) of psychological symptoms;* [b] *per SD increase in composite hardship variable;* [t] *trend*

Table 7-12: Psychological symptoms in second generation Irish children relative to rest of cohort; 1958 British birth cohort, age 11 (1969) n=10741

	Model 1			Model 2			Model 3		
	CR [a]	**(95% CI)**	**p value**	**CR [a]**	**(95% CI)**	**p value**	**CR [a]**	**(95% CI)**	**p value**
Second generation Irish (vs. non-Irish)	1.06	0.96,1.16	0.25	1.05	0.95,1.15	0.34	1.02	0.93,1.11	0.73
Female (vs. male)	0.70	0.67,0.73	p<0.001	0.70	0.67,0.73	p<0.001	0.70	0.67,0.73	p<0.001
Mother's age (years)	-	-	-	0.99	0.99,1.00	p<0.001 [t]	0.99	0.99,1.00	p<0.001 [t]
Mother left school before 15	-	-	-	1.28	1.22,1.35	p<0.001	1.23	1.17,1.29	p<0.001
Manual social class (father)	-	-	-	1.26	1.20,1.33	p<0.001	1.19	1.13,1.25	p<0.001
Hardship, 7[b]	-	-	-	-	-	-	1.17	1.14,1.19	p<0.001*

Key: *Model 1: Adjusted for gender; Model 2: Adjusted for gender, covariates from birth (mother's age, education, father's social class); Model 3: Adjusted for gender, covariates from birth (mother's age, education, father's social class) and contemporaneous material hardship;* [a] *Count Ratio (CR) of psychological symptoms;* [b] *per SD increase in composite hardship variable;* [t] *trend*

Table 7-13: Psychological symptoms in second generation Irish children relative to rest of cohort; 1958 British birth cohort, age 16 (1974); n=7363

	Model 1			Model 2			Model 3			Model 4		
	CR [a]	**(95% CI)**	**p value**	**CR [a]**	**(95% CI)**	**p value**	**CR [a]**	**(95% CI)**	**p value**	**CR [a]**	**(95% CI)**	**p value**
Second generation Irish (vs. non-Irish)	1.21	1.05,1.39	0.01	1.22	1.06,1.40	0.01	1.07	0.93,1.22	0.36	1.19	1.03,1.36	0.01
Female (vs. male)	0.80	0.75,0.86	p<0.001	0.80	0.75,0.85	p<0.001	0.80	0.75,0.85	p<0.001	0.80	0.76,0.86	p<0.001
Mother's age (years)	-	-	-	0.99	0.99,1.00	p<0.001 [t]	0.99	0.99,1.00	0.04 [t]	0.99	0.98,0.99	p<0.001 [t]
Mother left school before 15	-	-	-	1.44	1.33,1.55	p<0.001	1.33	1.23,1.44	p<0.001	1.42	1.31,1.53	p<0.001
Manual social class (father)	-	-	-	1.46	1.35,1.57	p<0.001	1.35	1.25,1.45	p<0.001	1.44	1.34,1.55	p<0.001
Hardship, 7 [b]	-	-	-	-	-	-	1.27	1.23,1.31	p<0.001*	-	-	-
Illness vs. no illness	-	-	-	-	-	-	-	-	-	1.33	1.24,1.44	p<0.001

Key: *Model 1: Adjusted for gender; Model 2: Adjusted for gender, covariates from birth (mother's age, education, father's social class); Model 3: Adjusted for gender, covariates from birth (mother's age, education, father's social class) and contemporaneous material hardship;Model 4: Adjusted for gender, covariates from birth (mother's age, education, father's social class) and parental chronic illness;* [a] *Count Ratio (CR) of psychological symptoms;* [b] *per SD increase in composite hardship variable;* [t] *trend*

Table 7-14: Psychological symptoms in second generation Irish children relative to rest of cohort. BCS70, age 16 (1986) n=2464

	Model 1			Model 2			Model 3			Model 4		
	CR [a]	**(95% CI)**	**p value**	**CR [a]**	**(95% CI)**	**p value**	**CR [a]**	**(95% CI)**	**p value**	**CR [a]**	**(95% CI)**	**p value**
Second generation Irish (vs. non-Irish)	0.88	0.69,1.13	0.31	0.87	0.68,1.10	0.24	0.85	0.67,1.09	0.20	0.78	0.62,1.00	0.05
Female (vs. male)	0.99	0.92,1.07	0.81	0.99	0.91,1.06	0.73	0.99	0.91,1.06	0.71	0.97	0.90,1.05	0.47
Mother's age (years)	-	-	-	0.99	0.99,1.00	0.02 [t]	0.99	0.98,1.00	0.02 [t]	0.99	0.98,1.00	p<0.001 [t]
Mother left school before 15	-	-	-	1.06	0.99, 1.15	0.10	1.04	0.96, 1.12	0.34	1.02	0.95,1.10	0.52
Manual social class (father)	-	-	-	1.22	1.13,1.32	p<0.001	1.17	1.08,1.26	p<0.001	1.20	1.11,1.29	p<0.001
Hardship, 7 [b]	-	-	-	-	-	-	1.10	1.06, 1.14	p<0.001*	-	-	-
Maternal psychological distress	-	-	-	-	-	-	-	-	-	1.64	1.49,1.80	p<0.001

Key: *Model 1: Adjusted for gender; Model 2: Adjusted for gender, covariates from birth (mother's age, education, father's social class); Model 3: Adjusted for gender, covariates from birth (mother's age, education, father's social class) and contemporaneous material hardship; Model 4: Adjusted for gender, covariates from birth (mother's age, education, father's social class) and maternal psychological distress.* [a] *Count Ratio (CR) of psychological symptoms;* [b] *per SD increase in composite hardship variable;* [t] *trend*

DISCUSSION

Main findings

In this chapter, I have presented analyses from two nationally representative British birth cohorts, covering the first 16 years of children's lives. In both cohorts, second generation Irish children grew up under conditions of marked material adversity, compared to children without a parental history of migration. In NCDS, Irish children had poorer psychological health at ages 7, 11 and 16 compared with children in the rest of the cohort. In BCS70, Irish children had greater emotional and behavioural problems at age 16.

In the NCDS, exposure to material adversity accounted for much of the excess psychological morbidity in Irish children relative to other cohort members. In BCS70, Irish-born mothers were also more likely to screen positive for high levels of psychological distress, when their child was aged 5 or 10; adjusting for maternal mental health led to a finding of slightly better mental health in second generation Irish 16 year olds, compared to the rest of the sample. The greater risk of mental and physical health problems in Irish-born parents was also partially or fully accounted for by material adversity indicators, this was the case across both cohorts. The results of this analysis therefore highlight the relevance of material adversity in the post-migration settlement context to observed health inequalities in Irish-born people. Given the consistency of associations observed across cohort members' early years, material adversity may be a common factor accounting for the health disadvantages of second generation Irish children and in their parents.

The findings implicate important risk factors for the mental health of migrant children, observed in two nationally representative birth cohorts separated by more than a decade. Specifically in NCDS, these were: material hardship at ages 7 and 16 and (to a lesser extent) parental chronic health problems at 16, and maternal psychological distress at 16 in BCS70. A recent systematic review indicated a complex picture of heterogeneity in the contemporary prevalence of mental health conditions in ethnic minority children growing up in Britain, with some groups experiencing better mental health and some

groups experiencing a more disadvantaged mental health profile, relative to white British children[262]. Very few studies had directly examined parental health or material hardship as putative mediating factors[262]. Although the context of Irish migration to Britain has changed over the last fifty years, future research could assess if these risk factors are still relevant to second generation Irish children growing up in Britain today, or if these factors have salience for the mental health of other second generation ethnic minority children living in Britain.

Previous studies have shown that Irish-born adults living in Britain have an elevated prevalence of mental health problems [78, 79], associated with un-planned migration and poorer social support[79]. The findings from the present study indicate that second generation Irish children also experienced an elevated prevalence of mental health problems, however these mental health problems were mediated by the poorer psychological health of their mothers. Of note, material hardship mediated mental health problems in both Irish children and in their mothers, as well as chronic health problems in Irish-born parents. This suggests potential for targeted intervention, in the post-migration settlement context.

The finding at age 16 that, after adjusting for maternal mental health and material hardship, mental health in Irish children was better than the rest of the 1970 birth cohort, has also been noted for other ethnic minority groups [262]. The main difference between the present study and previous work was that this was observed only *after* taking into account maternal mental health and material hardship, and not *in spite of* living in socially disadvantaged circumstances[262].

Childhood mental health may act as a distal risk factor for adult common mental disorders[88]. As it is known that Irish people living in Britain suffer an elevated prevalence of common mental disorders in adulthood[78, 322], the findings from the present study hint at potential life-course mechanisms for the “intergenerational transmission” of poorer mental health in this group[322].

Strengths and limitations

A strength of the dataset derives from its prospective design, with detailed, regular assessment of contemporaneous social circumstances experienced by cohort members as they grew up, together with the use of validated instruments to assess psychological health. Most measures were prospective and therefore less prone to measurement error. An exception was for the 'parental migration history' question which retrospectively asked for the country of birth of parents. It is reassuring that a high reliability (kappa) for the responses to this question was noted over two consecutive sweeps.

In NCDS, the question on parental origins was asked when children were aged 11 or 16. It was not possible to ascertain the parental origins of cohort members already lost to follow-up by this point. Conversely, although the question on parental origins was asked at birth in BCS70, a slightly larger proportion of Irish respondents refused participation at the later sweeps of the survey. It is not possible to know how this may have biased overall findings, although it is likely that this would have weakened effects. A further concern relates to the age 16 sweep of BCS70, where a large proportion of data was missing due to the teachers' strike that year[264]. This loss of information may have impacted on the power to detect differences in the sample. However, despite this, second generation Irish children continued to show social and mental health inequalities compared to the rest of the cohort at this age. The use of the two cohorts, suggesting relatively consistent results across time, lends support to the notion that missing data may not have overly impacted on overall conclusions.

In addition, there were slightly discrepant results across models adjusting for different sets of mediators. These discrepancies were minor for gender adjusted models in the 1958 Birth Cohort (compare tables 7-10 to 7-12 and 7-13; differences in estimates were to two decimal places for gender adjusted estimates at age 11 and 16). However differences were more notable at age 16 in BCS70, where a CR of 1.15 (95% CI: 1.01, 1.31; n=6769; table 7-10) became a CR of 0.88 (95% CI: 0.69, 1.13; n=2464; table 7-14) in gender adjusted models. The discrepant CRs between these two models were a reflection of the reduced number of cases used in complete case analyses. As discussed

in the previous paragraph, the teachers' strike led to a significant loss of data at age 16, leading to reduced power in complete case analyses.

Measures for parental health prior to migration were not available, and it was not possible to assess whether mental health problems in the parents were a consequence of adversity related to settlement[116], or alternatively, factors pre-dating migration[79]. A social rating of neighbourhoods was taken at age 5 in BCS70. Although assessed by an independent observer, as this was a subjective measure, this would have been a weaker assessment of area-level disadvantage, compared to measures commonly in use today such as the Index of Multiple Deprivation (IMD) [323]. Despite this, an advantage of this measure would have been its ability to capture residential deprivation at a much lower level than measures such as IMD.

A further limitation of the present study related to the period effects from using data with its origins in the late 1950s and early 1970s. As the cohorts were nationally representative of children born in Britain, a degree of generalisability to other children born at this time could be inferred, and the findings may implicate important risk factors for migration and childhood mental health. However, the circumstances surrounding migration and settlement of Irish families to Britain has changed markedly over the last fifty years, and so one should use a degree of caution in extrapolating the findings outside of this context to the present day.

A final limitation related to the necessity to group together parents who were born in Northern Ireland with parents born in Republic of Ireland, in order to derive the sample of 'second generation' Irish children, for this analysis. It was not possible to conduct analyses with these groups broken down further as this would have impacted adversely on the sample size and power to detect differences. The approach of grouping people from Northern Ireland together with people from Republic of Ireland has been taken by other investigators (*for example, see* [3, 67]), especially as it has been suggested that misclassification by country of birth is a possibility[3]. The concern over misclassification would have been a real possibility in these results as partition occurred in 1922 so Irish-born parents could have easily been born in the former 'United

Kingdom of Great Britain and Ireland (see Chapter 2), where the division between the Republic of Ireland and Northern Ireland had not yet occurred. However it is a limitation of the analysis that it was not possible to interrogate this category further; a recent analysis of the Census 2001 data confirmed that people born in Northern Ireland had poorer health than the white British reference population[47]. In addition, people reporting their ethnicity as 'Irish' and born in Northern Ireland had poorer health relative to people reporting their ethnicity as 'British' who were also born in Northern Ireland[47].

Conclusions

The findings highlighted in this chapter confirm that second generation Irish children grew up in relative social and material deprivation compared to children with two parents born in England, Scotland and Wales. These findings are significant as the social and material inequalities were present in both cohorts, and across two different time periods.

In addition, relative to the rest of the cohort, second generation Irish children experienced greater psychological problems at ages 7, 11, 16 (NCDS) and 16 (BCS70). This is a partial confirmation of hypothesis 1[64] outlined at the start of this chapter, as greater psychological morbidity was not seen in Irish children at age 5 and 10 in the 1970 birth cohort (BCS70). Greater mental and physical morbidity was also noted in Irish-born parents, relative to other parents in the rest of the cohort.

A final noteworthy finding related to putative mechanisms accounting for these health inequalities in both second generation Irish children, and in their parents. The social and material disadvantage to which Irish families were exposed to (relative to the rest of the cohort) in both NCDS and BCS70 mediated[304] the association between 2nd generation Irish status and childhood psychological morbidity as well as parental mental and

[64] Children of Irish-born migrants are more likely to have a higher prevalence of psychological distress, relative to children of non-migrant parents.

physical health morbidity. Excess psychological morbidity in the mothers of second generation Irish cohort members also mediated the association between 2nd generation Irish status and childhood emotional and behavioural health problems, in the 1970 birth cohort. The latter findings thus lend support to hypothesis 2[65].

The implications of these findings and potential limitations in the study design will be discussed in further in Chapter 10.

[65] An excess in psychological morbidity in children of Irish-born parents compared to non-Irish parents will be explained by parental social and health inequalities.

Summary points

1. Previously, there has been very little work on aetiological mechanisms accounting for Irish and other ethnic minority children's psychological health. This study addresses this gap in the literature.

2. Second generation Irish children in both cohorts were more likely to grow up under circumstances of marked material deprivation, compared to children of non-migrant parents; This may be taken to be an indication of the circumstances which Irish-born parents migrated into and settled in, in 1958 and in 1970.

3. Second generation Irish children were more likely to experience psychological problems in childhood across all childhood sweeps of the 1958 birth cohort and at age 16 in the 1970 birth cohort.

4. Relative to parents of non-Irish cohort members, Irish-born mothers were more likely to experience psychological distress when their child was aged 5 or 10 (BCS70) and Irish-born parents were more likely to report chronic physical health problems (NCDS).

5. Psychological problems in second generation Irish children and mental and physical health problems in Irish-born parents all significantly diminished after adjusting for material hardship in models.

6. Psychological problems in second generation Irish children diminished after adjusting for maternal psychological distress in models.

7. Material deprivation and maternal mental health mediated the association between Irish ethnicity and childhood psychological morbidity, in the cohorts.

8 Does childhood adversity account for poorer mental and physical health in second generation Irish people?

Introduction

In the previous chapter I presented a detailed enquiry into the childhood circumstances of second generation Irish children growing up in Britain in the 1960s and 1970s. The findings of this analysis highlighted stark social and material inequalities that differentially impacted on Irish children relative to the rest of the cohorts. These disadvantages accounted for an excess in psychological morbidity in second generation Irish children, as well as physical and psychological health problems in Irish-born parents. As I suggested in the previous chapter, these findings are not just a matter of historical curiosity, but may have much significance when considering health inequalities over the life-course.

In the literature review chapters I highlighted the evidence suggesting poorer mental and physical health among Irish people living in Britain, noting a scarcity of research on the aetiological mechanisms that may underpin these health disparities, and in particular an absence of research informed by the findings from the field of life-course epidemiology. As argued previously, this is a general issue when considering research into the health of migrant and ethnic minority groups. Thus, use of data from the birth cohorts to bring a life-course informed perspective to the field addresses a major gap in the literature. This approach has relevance not only to understanding the health of Irish people living in Britain, but also, potentially to understanding the effects of migration and settlement, over the life-course, on the health of other ethnic minority groups. As suggested previously, the policy benefits of using a life-course informed approach are obvious; by identifying structural factors that impact on the health of second generation Irish people from childhood through to adulthood, it may be possible to identify earlier 'intervention points', which, if targeted appropriately could reduce later 'downstream' adverse health outcomes.

In the present chapter I will use data from the early and later adulthood sweeps of the 1958 British birth cohort to establish if the material and social disadvantages experienced in childhood described in the previous chapter tracked or continued into adulthood for Irish cohort members, relative to people without a parental history of migration. My second objective will be to establish if the prevalence of common mental disorders and self-rated health (a predictor for mortality[73]) is elevated in second generation Irish cohort members relative to the rest of the cohort, at age 23, 33, and at mid-life (age 44/ 45). A final objective will be to establish if disadvantage over the life-course mediates health disparities observed at mid-life (age 44/ 45) in second generation Irish cohort members. I shall assess the contribution of disadvantage broken down by:

1. *Timing* of exposure (childhood, early adulthood, mid-life) and

2. *Type* of exposure (material disadvantage; health-related behaviours such as tobacco use and alcohol misuse; prior mental health and self-rated health; social support and stressful life events) .

This approach is of interest given the life-course epidemiological literature described previously in Chapter 3.

Methods

Measures

Data derived from the Clinical Interview Schedule-Revised (CIS-R) and a self-rating of health were the two main outcome measures. The CIS-R is an assessment instrument for common mental disorders [81]. As described in Chapter 5, a shortened version of the CIS-R was used in the fieldwork stages of the biomedical sweep of NCDS, in which 9 of the original 14 sections were administered[289]. On the full-scale CIS-R a cut-point of ≥12 is typically used to determine 'common mental disorders'[81]. By using a linear regression approach to compare the full-scale CIS-R to the abbreviated scale CIS-R, I determined that a cut-off of ≥9 would be equivalent to the usual ≥12 cut-point on the full-scale CIS-R. Further details as to how I determined this are described in Chapter 5. The CIS-R was used to assess common mental disorders at mid-life (age 44/ 45). Prior

to this (at age 23 and 33) the Malaise Inventory[280] was used to assess depression, by employing a cut-point of ≥8. The psychometric properties of the Malaise Inventory are discussed in full in Chapter 5.

Self-rated health was the other main outcome in this study. The question in the biomedical sweep of NCDS asked respondents to rate their health. People rating their health as 'fair' or 'poor' were grouped together and compared to people rating their health as 'good' or 'excellent'. This question was asked at all of the adult time-points of the cohort (age 23, 33 and 44/ 45).

In addition a variety of social and material adversity indicators from childhood through to mid-life were used in analyses. These measures assessed material hardship and housing quality/ living conditions, social support and stressful life events as well as job security, employment and extreme adversity events such as homelessness. A full description of these variables is detailed in Chapter 6.

To assess prior health-related behaviours over the life-course measures for self-reported tobacco use at age 23, 33 and 42 were used. For alcohol use, 'hazardous alcohol use' as determined through the CAGE[292] at age 33 and 42 and 'harmful alcohol use' as determined at age 44/ 45 through the AUDIT[302] was used. A full description of these measures and psychometric properties is described in Chapter 6.

Analytic methods

For this part of the analysis, I used data from the childhood and adult sweeps of NCDS (birth, 7, 11, 16, 23, 33, 42, 44/45). I deployed the multiple imputation procedures described in Chapter 6, since, as described previously, missing data due to attrition was a concern. At age 7, 11 and 16 response rates were 89%, 88%, 84%, and at 23, 33, 42 response rates were 72%, 65% and 66%[324]. At age 44/ 45, complete data was available for the CIS-R for 9297 individuals (which was 99% of the biomedical sample), and on self-rated health in 9115 individuals (97% of the biomedical sample).

To assess if second generation Irish cohort members with poorer health were more likely to emigrate out of the cohort, a series of analyses were performed. In the first set

of analyses, the interaction of ethnicity ('non-Irish' vs. '2nd generation Irish') with depression at 23 was assessed with the outcome "loss to follow-up due to emigration out of the cohort". This outcome was assessed at ages 33 and 42. A similar set of interaction analyses were performed for depression at 33 and "loss to follow-up due to emigration" at 42. Finally, these analyses were repeated for poorer self-rated at age 23 and at 33.

Results

Response rates

Rates of attrition were similar in second generation Irish respondents compared to the rest of the sample (Table 8-1). In un-imputed data, at age 7 years, 90% of Irish children had a father of a manual social class background, compared with 82% of non-Irish children. The proportion with this characteristic at age 7 remained fairly similar for those re-interviewed at age 42 (90% and 81%, respectively), indicating that there had not been differential attrition by childhood social class over the course of follow-up.

Table 8-1: Response rates at each sweep of NCDS (un-imputed data)

Sweep (age- years)	**0 (0)**	**1 (7)**	**2 (11)**	**3 (16)**	**4 (23)**	**5 (33)**	**6 (42)**	**Biomedical sweep (44/45)**
Year	1958	1965	1969	1974	1981	1991	2000	2002
Number (% of total (n=16765*)) present in analysis sample at each sweep	16553 (99%)	14258 (85%)	13915 (83%)	13138 (78%)	11411 (68%)	10460 (62%)	10412 (62%)	8690 (52%)
	The above figures include Irish respondents in the totals							
Number (% of total (n=791)) of second generation Irish respondents in analysis sample**	782 (99%)	710 (90%)	761 (96%)	699 (88%)	544 (69%)	509 (64%)	505 (64%)	417 (53%)

***Key**:*Excludes children who migrated to Britain and were not born in England, Scotland or Wales in the index week, 1958 (n=920). Also excludes children who had one or both parents born outside England, Scotland, Wales, Ireland or Northern Ireland (n=1251); **After excluding migrant children, there were 791 children who were second generation Irish within NCDS*

9377 cohort members provided data at age 44/45. Excluding migrants and children with parents not born in England, Scotland, Wales, Ireland or Northern Ireland, analyses were performed on 8403 individuals providing complete information on the CIS-R, and on 8243 individuals providing a response to the self-rated health at mid-life question.

Reasons for losses to follow-up

The following table highlights the reasons for losses to follow-up in each sweep of NCDS, by parental migration history.

The column denoted 'other' in Table 8-2 were children who reported having one or both parents born outside of Ireland, Northern Ireland or Britain. This group were excluded from analyses, and are presented here purely for comparison. There was some evidence to suggest that second generation Irish cohort members were slightly more likely to be lost to follow-up either through emigration out of the cohort or for 'other' reasons, particularly in the later sweeps of the cohort, although proportions were not too dissimilar to the rest of the sample. However, a separate set of analyses[66] were conducted to specifically assess if Irish cohort members with poorer health were more likely to be lost to follow-up through out-migration from the cohort. For this part of the analysis, no statistically significant interactions were found between Irish ethnicity and either depression or poorer self-rated health in predicting later out-migration from the cohort, supporting the view that second generation Irish cohort members with poorer health were no more likely to be lost to follow-up due to emigration, relative to the rest of the sample.

[66] As described in the previous section ('*Analytic methods*')

Table 8-2: Reasons for losses to follow-up in NCDS; imputed data

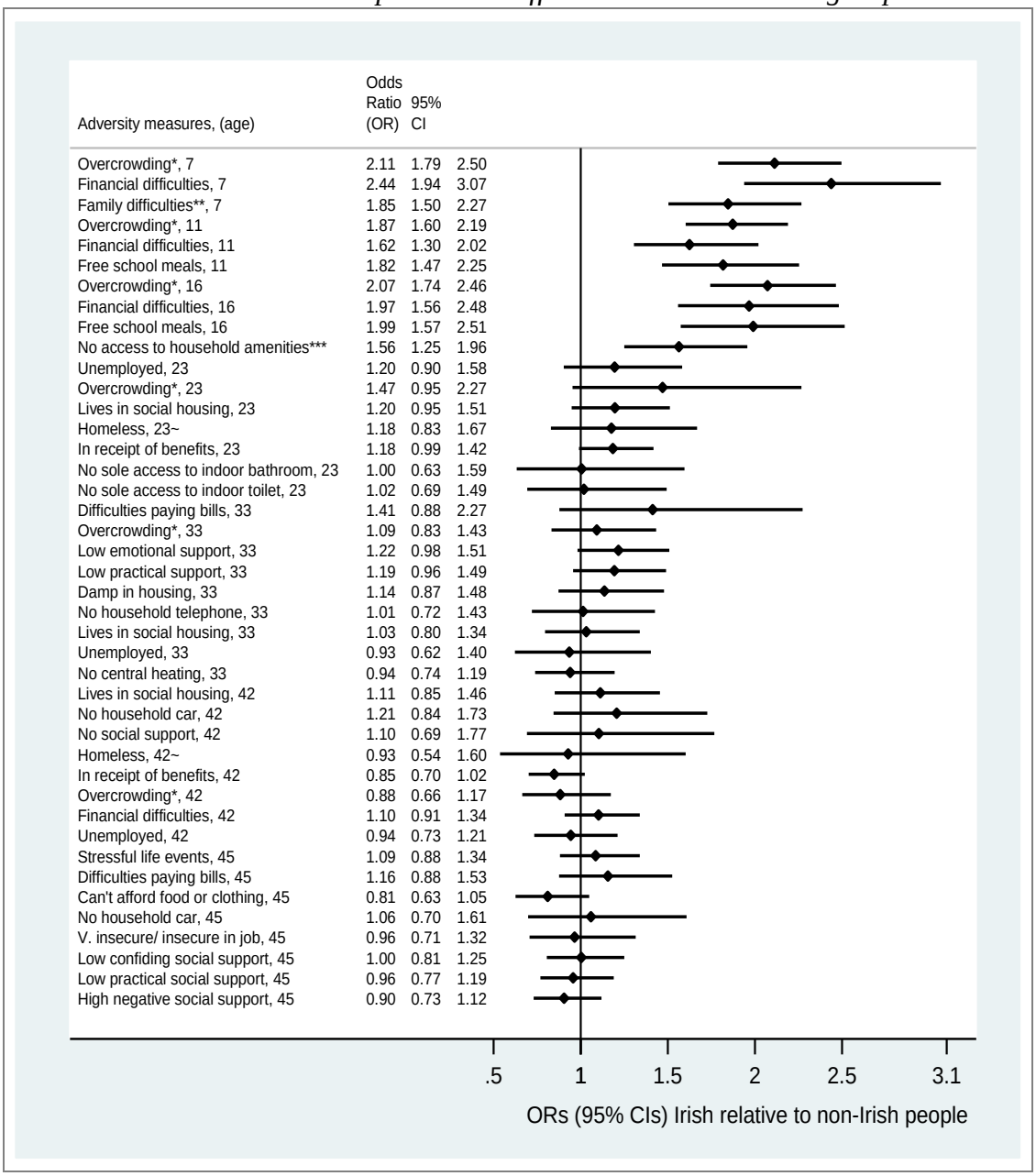
	UK (%)	2nd generation Irish (%)	Other (%)	Total (%)
Birth				
some data available	99%	99%	99%	99%
no data- other reason	1%	1%	1%	1%
Age 7				
some data available	90%	86%	86%	90%
emigrated out of the cohort	3%	3%	5%	3%
no data- other reason	7%	10%	9%	8%
Age 11				
some data available	88%	88%	85%	88%
emigrated out of the cohort	4%	4%	6%	4%
no data- other reason	8%	8%	9%	8%
Age 16				
some data available	84%	81%	80%	83%
emigrated out of the cohort	4%	6%	7%	4%
no data- other reason	12%	13%	13%	12%
Age 23				
some data available	73%	64%	66%	72%
emigrated out of the cohort	6%	8%	10%	7%
no data- other reason	20%	28%	24%	21%
Age 33				
some data available	68%	61%	61%	67%
emigrated out of the cohort	7%	9%	11%	7%
no data- other reason	25%	30%	28%	26%
Age 42				
some data available	68%	61%	60%	67%
emigrated out of the cohort	7%	10%	11%	7%
no data- other reason	25%	29%	29%	26%

Social adversity over the life course

Figure 8-1 displays how social adversity differed for second generation Irish cohort members, compared to non-Irish counterparts, over the life-course. Irish cohort members experienced marked social adversity across all childhood sweeps, relative to the rest of the cohort. These inequalities tracked into early adulthood, with differences still apparent at age 23, and to an extent, at 33. By mid-life (42, 44/ 45) social adversity measures were equivalent in second generation Irish cohort members relative to non-Irish cohort members. See the Appendix for supplementary tables, displaying: 1. The distribution of adversity measures (proportions) according to ethnicity (Appendix H, Table 6) and 2. Changes to social class over the life-course, by ethnicity (Appendix C, Table 1).

Figure 8-1: Odds ratios for social adversity across the life-course; Second generation Irish cohort members relative to non-Irish cohort members.

Estimates on the vertical line represent no difference between the two groups



Key: **more than one person/ room; **one or more family difficulties as prospectively rated by health visitor (difficulties with: housing, finances, physical illness/ disability, mental illness/ neurosis, mental sub-normality, death of child's mother or father, divorce/ separation/ desertion, domestic tension, "in-law" conflicts, unemployment, alcoholism, or any 'other serious family difficulties affecting child's development'); ***no access to at least one of: indoor bathroom, indoor toilet or hot water at either age 7, 11, or 16; ~periods of homelessness since last assessment*

Whereas the previous figure displays prospectively assessed psychosocial adversity, the following table (Table 8-3)shows the association of second generation Irish status (relative to the rest of the sample) with measures where participants were asked to recall if their parent had a mental health or alcohol problem when they were growing up. This question was asked at mid-life (age 44/ 45).

Table 8-3: Association of parental migration history with recalled measures of parental health and health-related behaviours from childhood

Models have adjusted for gender

		2nd generation Irish relative to rest of cohort		
Variable	**N**	**OR**	**(95% CI)**	**p**
Either parent had 'nervous or emotional trouble' when cohort members were children*	8154	1.30	1.04,1.62	0.02
Either parent had 'trouble with drinking' when cohort members were children*	8156	2.18	1.72,2.77	<0.001

**Key: ***Recalled by cohort members through a structured questionnaire asked at age 44/ 45*

Table 8-4 and Table 8-5 display differences in common mental disorders and self-rated assessments of health, respectively, assessed at age 23, 33, and 44/45.

After adjusting for gender, second generation Irish cohort members were 1.44 times more likely to screen positive for depression at 23 (95% CI: 1.06, 1.94) (Table 8-4). Second generation Irish cohort members continued to carry this relative excess risk throughout their life, although the magnitude of the difference had diminished by mid-life. In contrast, second generation Irish cohort members were no more likely to report fair or poorer self-rated health in early adulthood (age 23, 33), although by mid-life (age 44/45) there was a suggestion of widening inequalities affecting the Irish group with respect to this measure (Table 8-5).

Table 8-4: Common mental disorders in second generation Irish people over the life course

Age		Total number of observations	Proportion case CMD (%)	OR	(95% CI)
23†	All other	11036	8%	1.00	(ref)
	2nd generation Irish		11%	1.44	1.06,1.94
33†	All other	9980	7%	1.00	(ref)
	2nd generation Irish		9%	1.31	0.94,1.81
45‡	All other	8403	13%	1.00	(ref)
	2nd generation Irish		15%	1.27	0.96,1.69

Key: *† Assessed with the Malaise Inventory; ‡ Assessed with the CIS-R; All models adjusted for gender*

Table 8-5: Poorer self-rated health in second generation Irish people over the life course

Age		Number of observations	Proportion cases reporting fair/ poor health	OR	(95% CI)
23	All other	11067	10%	1.00	(ref)
	2nd generation Irish		11%	1.06	0.79,1.43
33	All other	10045	14%	1.00	(ref)
	2nd generation Irish		14%	1.06	0.81,1.37
45	All other	8243	21%	1.00	(ref)
	2nd generation Irish		25%	1.25	0.98,1.60

Gender stratified associations with mid-life common mental disorders and self-rated health

To assess the prevalence of common mental disorders and self-rated health stratified by gender, the analyses were repeated specifying a gender interaction term. These results are presented in Table 8-6[67]. None of the gender*Irish ethnicity interactions were statistically significant, suggesting that experiences of common mental disorders and self-rated health over the life-course were broadly similar across second generation Irish men and women.

[67] Note estimates displayed in Table 8-6 were derived from the dataset which was generated for analyses presented in the next chapter on health-related behaviours, as this dataset specified interactions with gender for all variables. This dataset was preferred for displaying the stratified estimates as the imputation regression equation would be more 'congenial' to gender-stratified analyses (316. White, I.R., P. Royston, and A.M. Wood, *Multiple imputation using chained equations: Issues and guidance for practice*. Statistics in Medicine 2011. **30**(4): p. 377-399.). Therefore estimates for overall associations (adjusted for gender) differ slightly from the results presented in Table 8-4 and 8-5 but are displayed for comparison.

Table 8-6: Common mental disorders and self-rated health in second generation Irish people across the life course, gender-stratified associations

Age		OR	(95% CI)
Common mental disorders			
23†	Second generation Irish (not stratified)	1.44	1.07,1.93
	Second generation Irish men	1.54	0.93, 2.55
	Second generation Irish women	1.39	0.97, 2.00
33†	Second generation Irish (not stratified)	1.33	0.96,1.85
	Second generation Irish men	1.14	0.62,2.09
	Second generation Irish women	1.44	0.97, 2.14
45‡	Second generation Irish (not stratified)	1.26	0.95, 1.68
	Second generation Irish men	1.07	0.66, 1.73
	Second generation Irish women	1.40	0.98, 1.99
Poor self-rated health			
23	Second generation Irish (not stratified)	1.06	0.79,1.43
	Second generation Irish men	1.20	0.79,1.81

Age		OR	(95% CI)
	Second generation Irish women	0.95	0.62, 1.45
33†	Second generation Irish (not stratified)	1.07	0.82,1.40
	Second generation Irish men	1.00	0.68,1.47
	Second generation Irish women	1.14	0.80,1.63
45‡	Second generation Irish (not stratified)	1.26	0.99,1.60
	Second generation Irish men	1.32	0.94,1.84
	Second generation Irish women	1.20	0.85,1.70

Key

† Assessed with the Malaise Inventory; ‡ Assessed with the CIS-R. Models have either been adjusted for gender or stratified by gender

Self-rated health and common mental disorders at mid-life health in second generation Irish cohort members

The association between being second generation Irish and screening positive for common mental disorders and poorer self-rated health at mid-life was next assessed after taking into account exposures at earlier time points. Specifically I assessed if earlier types of exposure (for example health-related behaviours such as smoking and alcohol misuse, earlier mental health in adulthood and in childhood) mediated the association of 2nd generation Irish status with mid-life health outcomes of common mental disorders and self-rated health. The following section considers the role of mediation for each of these outcomes in turn.

Do earlier exposures mediate the association between Irish ethnicity and mid-life common mental disorders?

I assessed if the timing or 'type' of exposure mediated the association of mid-life common mental disorders and second generation Irish ethnicity, as noted in Table 8-4. This was assessed by introducing putative mediators into models and assessing if the excess odds of common mental disorders, in second generation Irish cohort members relative to the rest of the sample, was attenuated. The following tables, based on imputed data, summarise these analyses. Complete case analyses are presented in Appendix F, Table 4.

Table 8-7: Association of parental migration history (Irish-born versus non-Irish) with mid-life common mental disorders in cohort members, taking into account material adversity over the life-course

Models a-b (adjusting for material adversity at mid-life)

	Baseline model	**Adj. for gender and Irish ethnicity**		**Model a**	**Adj. for material adversity age 44/ 45**		**Model b**	**Adj. for material adversity age 42**	
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
2nd generation Irish	1.27	0.96,1.69	0.10	1.28	0.95,1.72	0.10	1.28	0.95,1.72	0.10
Female gender	1.81	1.57,2.07	p<0.001	1.82	1.58,2.09	p<0.001	1.68	1.45,1.94	p<0.001
Material adversity, (age 44/ 45)									
Difficulties paying bills	-	-	-	2.29	1.89,2.78	p<0.001	-	-	-
Can't afford food or clothing	-	-	-	1.92	1.61,2.29	p<0.001	-	-	-
No access to household car	-	-	-	1.51	1.18,1.93	p<0.001	-	-	-

	Baseline model	Adj. for gender and Irish ethnicity		Model a	Adj. for material adversity age 44/ 45		Model b	Adj. for material adversity age 42	
	OR	95% CI	p value	OR	95% CI	p value	OR	95% CI	p value
Material adversity, (age 42)									
In council housing	-	-	-	-	-	-	1.91	1.57,2.31	p<0.001
No access to car	-	-	-	-	-	-	1.04	0.77,1.42	0.80
Has been homeless	-	-	-	-	-	-	1.47	1.07,2.02	0.02
Receiving benefits	-	-	-	-	-	-	0.85	0.72,1.00	0.05
Overcrowding	-	-	-	-	-	-	0.90	0.71,1.15	0.41
Financial difficulties	-	-	-	-	-	-	1.92	1.65,2.23	p<0.001
Unemployed	-	-	-	-	-	-	2.00	1.68,2.38	p<0.001

Models c-d: Adjusting for material adversity at age 23 and 33

		Adj. for gender and Irish ethnicity			Adj. for material adversity, age 33			Adj. for material adversity age 23	
	OR	**95% CI**	**p value**	**OR**	**95%CI**	**p value**	**OR**	**95% CI**	**p value**
	Baseline model			**Model c**			**Model d**		
2nd generation Irish	1.27	0.96,1.69	0.10	1.26	0.94,1.69	0.12	1.18	0.88,1.57	0.27
Female gender	1.81	1.57,2.07	p<0.001	1.86	1.61,2.14	p<0.001	1.71	1.49,1.97	p<0.001
Material adversity, (age 33)									
Unemployed	-	-	-	1.71	1.26,2.31	p<0.001	-	-	-
Household crowding	-	-	-	0.93	0.74,1.17	0.54	-	-	-
In arrears with bills	-	-	-	1.82	1.27,2.60	p<0.001	-	-	-
No access to phone	-	-	-	0.69	0.52,0.90	0.01	-	-	-
Damp in housing	-	-	-	1.31	1.06,1.61	0.01	-	-	-
Lives in council house	-	-	-	2.12	1.74,2.58	p<0.001	-	-	-
No central heating in home	-	-	-	0.92	0.76,1.12	0.41	-	-	-
Reduced access to amenities	-	-	-	1.59	0.86,2.92	0.14	-	-	-
Material adversity (age 23)									
No/ shared access to indoor toilet	-	-	-	-	-	-	1.48	0.97,2.27	0.07
No/ shared access to indoor bathroom	-	-	-	-	-	-	0.76	0.43,1.32	0.33

		Adj. for gender and Irish ethnicity			Adj. for material adversity, age 33			Adj. for material adversity age 23	
	OR	**95% CI**	**p value**	**OR**	**95%CI**	**p value**	**OR**	**95% CI**	**p value**
	Baseline model			**Model c**			**Model d**		
Lives in council house	-	-	-	-	-	-	1.55	1.25,1.92	p<0.001
Has been homeless	-	-	-	-	-	-	1.72	1.33,2.23	p<0.001
Receiving benefits	-	-	-	-	-	-	1.46	1.23,1.74	p<0.001
Household crowding	-	-	-	-	-	-	1.03	0.66,1.62	0.89
Unemployed	-	-	-	-	-	-	1.24	0.96,1.60	0.10

Model e: Adjusting for material adversity in childhood (age 7, 11, 16)

See Appendix E Table 3 for models assessing mediation by childhood material adversity variables, broken down further by age (age 7, 11 or 16)

	Baseline model	**Adj. for gender & Irish ethnicity**		**Model e**	**Adj. for material adversity in childhood**	
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
Second generation Irish	1.27	0.96,1.69	0.10	1.12	0.84,1.50	0.44
Female gender	1.81	1.57,2.07	p<0.001	1.79	1.56,2.06	p<0.001
Childhood material adversity (age 7, 11, 16)						
Household crowding once	-	-	-	1.05	0.84,1.31	0.67
Household crowding twice	-	-	-	1.15	0.92,1.44	0.23
Household crowding thrice	-	-	-	1.08	0.88,1.31	0.46
Financial difficulties once	-	-	-	1.52	1.20,1.92	p<0.001
Financial difficulties twice	-	-	-	1.88	1.31,2.69	p<0.001
Financial difficulties thrice	-	-	-	2.91	1.77,4.79	p<0.001
Free school meals once	-	-	-	1.24	0.94,1.64	0.12
Free school meals twice	-	-	-	1.43	1.01,2.04	0.04
No access to indoor toilet, bathroom or hot water at 7, 11 or 16	-	-	-	1.22	1.00,1.50	0.05

Table 8-8: Association of parental migration history (Irish-born versus non-Irish) with mid-life common mental disorders in cohort members, taking into account health-related behaviours (alcohol use and tobacco use) over the life-course

Models a-b: Adjusting for prior hazardous and harmful alcohol use

	Base-line model	**Adj. for gender and Irish ethnicity**		**Model a**	**Adj. for hazardous alcohol use***		**Model b**	**Adj. for harmful alcohol use****	
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
2nd generation Irish	1.27	0.96,1.69	0.1	1.23	0.92,1.64	0.16	1.25	0.94,1.67	0.12
Female gender	1.81	1.57,2.07	p<0.001	1.98	1.72,2.27	p<0.001	2.05	1.77,2.37	p<0.001
Hazardous alcohol use on 1 occasion*	-	-	-	1.47	1.24,1.74	p<0.001	-	-	-
Hazardous alcohol use* on 2 occasions	-	-	-	1.61	1.35,1.93	p<0.001	-	-	-
Harmful alcohol use**	-	-	-	-	-	-	1.65	1.41,1.94	p<0.001

Key: **1+ on CAGE at age 33, 42; **8+ on AUDIT age 44/ 45*

Models c: Adjustment for prior smoking over the life-course (age 23, 33, 42)

	Baseline model	**Adjusting for gender and Irish ethnicity**		**Model c**	**Adj. for smoking**	
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
Second generation Irish	1.27	0.96,1.69	0.1	1.26	0.95,1.67	0.12
Female gender	1.81	1.57,2.07	p<0.001	1.82	1.59,2.09	p<0.001
Current or ex-smoker on at least one occasion	-	-	-	1.26	1.08,1.47	p<0.001

Table 8-9: Association of parental migration history (Irish-born versus non-Irish) with mid-life common mental disorders in cohort members, taking into account prior psychological health (childhood and early adulthood) over the life-course

	Baseline model	**Adj. for gender & Irish ethnicity**		**Adj. for childhood internalising/ externalising disorders †**			**Adj. for depression* in early adulthood**		
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
2nd generation Irish	1.27	0.96,1.69	0.1	1.21	0.91,1.62	0.19	1.33	0.97,1.81	0.08
Female gender	1.81	1.57,2.07	p<0.001	1.99	1.73,2.29	p<0.001	1.42	1.23,1.65	p<0.001
Childhood internalising and externalising disorders (age 7, 11, 16) †									
Case once †	-	-	-	1.70	1.42,2.05	p<0.001	-	-	-
Case twice †	-	-	-	2.43	1.84,3.21	p<0.001	-	-	-
Case thrice †	-	-	-	3.63	2.27,5.80	p<0.001	-	-	-
Adult depression (age 23 or 33)*									
Depressed* on at least one occasion, age 23, 33	-	-	-	-	-	-	7.86	6.76,9.13	p<0.001

Key: *† screened positive as a 'case' on the Bristol Social Adjustment Guide or Rutter-B at age 7, 11 or 16; *Depression as assessed through the Malaise Inventory*

Table 8-10: Association of parental migration history (Irish-born versus non-Irish) with mid-life common mental disorders in cohort members, taking into account prior social support over the life-course

Models a-b: Adjusting for social support at age 33 and 42

	Baseline model	**Adjusting for gender and Irish ethnicity**		**Model a**	**Adjusting for social support at age 33**		**Model b**	**Adjusting for social support age 42**	
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
Second generation Irish	1.27	0.96,1.69	0.1	1.25	0.94,1.67	0.12	1.27	0.95,1.69	0.10
Female gender	1.81	1.57,2.07	p<0.001	1.93	1.67,2.22	p<0.001	1.86	1.62,2.13	p<0.001
Social support, age 33									
Emotional support*	-	-	-	0.79	0.61,1.01	0.06	-	-	-
Practical support*	-	-	-	0.75	0.59,0.97	0.03	-	-	-
Social support, age 42									
Poor social support**	-	-	-	-	-	-	1.94	1.39,2.70	p<0.001

Key: **medium to high vs. low levels of emotional and practical social support;* ********Cohort member does not have someone they could turn to for advice and support (versus does have someone);*

Model c: Adjusting for social support at age 44/ 45

	Baseline model	**Adjusting for gender and Irish ethnicity**		**Adjusting for social support age 44/ 45**		
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
2nd generation Irish	1.27	0.96,1.69	0.10	1.30	0.97,1.73	0.07
Female gender	1.81	1.57,2.07	p<0.001	1.83	1.59,2.10	p<0.001
Social support age 44/ 45*						
Confiding emotional support	-	-	-	0.92	0.78,1.08	0.29
Practical support	-	-	-	0.98	0.84,1.14	0.76
Negative support	-	-	-	0.50	0.43,0.58	p<0.001

***Key: ****social support assessed on the Close Person's Questionnaire- intermediate to high levels of confiding emotional and practical social support versus low levels, and low levels negative social support versus intermediate to high levels;*

Table 8-11: Association of parental migration history (Irish-born versus non-Irish) with mid-life common mental disorders in cohort members, taking into account prior stressful life events, job insecurity (in adulthood) and childhood family adversity

Model a-b: Adjusting for stressful life events and job security at age 44/ 45

	Base-line model	**Adj. for gender & Irish ethnicity**		**Model a**	**Adj. for stressful life events***		**Model b**	**Adj. for job insecurity**	
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
2nd generation Irish	1.27	0.96,1.69	0.1	1.24	0.93,1.66	0.14	1.28	0.96,1.72	0.09
Female gender	1.81	1.57,2.07	p<0.001	1.80	1.57,2.07	p<0.001	1.99	1.73,2.30	p<0.001
1+ stressful life events	-	-	-	2.51	2.15,2.93	p<0.001	-	-	-
Not v. secure/insecure in current job	-	-	-	-	-	-	2.62	2.15,3.18	p<0.001

Key: *'Stressful Life event's in the last six months were: cohort member or close relation suffering serious illnesses, injury/ assault, death of parent/ child/ partner, death of a close friend/ relative, end of a serious relationship or separation, serious problems with a close friend/ neighbour/ relative, serious disappointments at work, cohort member/ partner fears losing one's job, losing one's job, major financial crises, problems with the police, and experiences of theft. Responses were dichotomised into '0 stressful life events' vs. '1+ stressful life events'*

Model c: Adjusting for family difficulties at age 7

	Baseline model OR	**Adjusting for gender and Irish ethnicity 95% CI**	**p value**	**Model c OR**	**Adjusting for family adversity, age 7 95% CI**	**p value**
Second generation Irish	1.27	0.96,1.69	0.10	1.19	0.89,1.58	0.25
Female gender	1.81	1.57,2.07	p<0.001	1.80	1.57,2.06	p<0.001
One or more family difficulties*, age 7	-	-	-	1.73	1.45,2.07	p<0.001

Key: ****'Family difficulties' as assessed by the Health Visitor, comprising one or more of problems with: housing, finances, physical or mental illness/ disability, learning disabilities, death, divorce, parental separation, domestic tensions, in-law conflicts, unemployment, alcoholism, or any other difficulties 'affecting child's development'.*

Table 8-12: Association of parental migration history (Irish-born versus non-Irish) with mid-life common mental disorder, taking into account measures of parental psychological health and health-related behaviours, as recalled by cohort members at mid-life

	Baseline model	**Adj. for gender and Irish ethnicity**		**Adj. for parental nervous/ emotional troubles in childhood**			**Adj. for parental alcohol problems in childhood**		
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
Second generation Irish	1.27	0.96,1.69	0.10	1.20	0.90,1.60	0.22	1.15	0.87,1.54	0.33
Female gender	1.81	1.57,2.07	p<0.001	1.72	1.49,1.97	<0.001	1.77	1.54,2.03	<0.001
Either parent had 'nervous or emotional trouble'*	-	-	-	2.56	2.23,2.94	<0.001	-	-	-
Either parent had 'trouble with drinking'*	-	-	-	-	-	-	2.05	1.73,2.42	<0.001

Key: **Recollections of childhood, cohort members were asked this question when they were aged 44/ 45*

The results presented in Table 8-8 suggest that whereas prior alcohol misuse (as assessed through the CAGE or the AUDIT) or tobacco use were in themselves associated with an increased risk of common mental disorders at mid-life, these variables did not particularly attenuate the association of 2nd generation Irish status with mid-life common mental disorders. Similarly, social support and stressful life events in adulthood also did not mediate the increased relative odds of common mental disorders at mid-life in Irish cohort members, although were, in themselves, generally associated with either increasing the risk or mitigating against mid-life common mental disorders in the full sample (Table 8-10; Table 8-11). Although previous psychological morbidity in childhood or previous common mental disorders in early adulthood had strong associations with mid-life common mental disorders in the full sample, these did not in themselves mediate the excess risk of mid-life common mental disorders, in Irish cohort members (Table 8-9). This is noteworthy given the excess prevalence of childhood emotional and psychological problems in Irish cohort members relative to the rest of the sample, noted in the previous chapter, as well as the increased relative odds of depression at age 23 noted earlier in this chapter (Table 8-4).

Of note, the findings in Table 8-7 do suggest however, that material hardship in childhood and to a certain extent in early adulthood (age 23) mediated the association of second generation Irish status with mid-life common mental disorders. A similar association was found for the variable 'family difficulties' assessed at age 7 (Table 8-11; model c). A further noteworthy finding was that the addition of the (recalled) 'parental alcohol problems in childhood' variable to models also attenuated the association of second generation Irish status with mid-life CMD (Table 8-12). The following table (Table 8-13) summarises the findings reported in the previous tables further.

Table 8-13: Association of parental migration history (Irish vs. non-Irish) with common mental disorders at mid-life (age 44/ 45)

Age	Adjustments	OR	95% CI	p value
Baseline model: Association of ethnicity (Irish vs. non Irish) with mid-life common mental disorders after adjusting for gender only				
44/ 45	Gender	1.27	0.96,1.69	0.10
Models adjusting for gender + material adversity over the life-course				
44/ 45	Material adversity	1.28	0.95,1.72	0.10
42	Material adversity	1.28	0.95,1.72	0.10
33	Material, adversity	1.26	0.94,1.69	0.12
23	Material adversity	1.18	0.88,1.57	0.27
7, 11, 16	Material adversity	1.12	0.84,1.50	0.44
Models adjusting for gender + health-related behaviours				
44/ 45	Hazardous alcohol use	1.25	0.94,1.67	0.12
33, 42	Hazardous alcohol use	1.23	0.92,1.64	0.16
23, 33, 42	Smoker or ex-smoker	1.26	0.95,1.67	0.12
Models adjusting for gender + previous mental health over the life-course				
23, 33	Adult depression	1.33	0.97,1.81	0.08
7, 11, 16	Childhood psychological problems	1.21	0.91,1.62	0.19
Models adjusting for gender + social support over the life-course				
44/ 45	Social support	1.30	0.97,1.73	0.07
42	Social support	1.27	0.95,1.69	0.10
33	Social support	1.25	0.94,1.67	0.12
Models adjusting for gender + stressful life events over the life-course				
44/ 45	Job insecurity	1.28	0.96,1.72	0.09
44/ 45	Stressful life events	1.24	0.93,1.66	0.14
7	Family adversity	1.19	0.89,1.58	0.25
Models adjusting for gender + recalled parental health in childhood				
Childhood	Parental alcohol problems	1.15	0.87,1.54	0.33
Childhood	Parental mental health problems	1.20	0.90,1.60	0.22

Key: *Refer to Table 8-14 for full list of variables used in analyses. See Appendix F, Table 4 for complete case models.*

Table 8-14: Full description of mediators used in analyses

Age	*Variable*	
44/ 45	*Material adversity*	*Difficulties paying bills, sometimes/ often can't afford food or clothing, no household car*
42	*Material adversity*	*Lives in council housing homeless since last sweep, on benefits, household overcrowding, finances- 'just about getting by/ finding it quite/ v. difficult', unemployed*
33	*Material adversity*	*Unemployed, household overcrowding, in arrears with bills, no access to phone, damp in home, lives in council housing, no central heating, shared household amenities*
23	*Material adversity*	*No access/ shared access to indoor toilet, no/ shared access to indoor bathroom, lives in council housing, homeless since last sweep, in receipt of benefits, household overcrowding, unemployed*
7, 11, 16	*Material adversity*	*Household overcrowding, financial difficulties, qualifies for free school meals, no access to: indoor toilet/hot water/ bathroom at age 7, 11, or 16*
44/ 45	*Hazardous alcohol use*	*Scored ≥8 on the AUDIT*
33, 42	*Hazardous alcohol use*	*Scored ≥1 on the CAGE*
23, 33	*Adult depression*	*Scored ≥8 on the Malaise inventory at least once*
7, 11, 16	*Childhood psychological problems*	*Emotional and/ or behavioural problems at age 7, 11 (BSAG), or age 16 (Rutter-B)*
44/ 45	*Social support*	*Emotional & confiding, practical and negative social support (Close Person's Questionnaire)*
42	*Social support*	*Has someone they could turn to for support*
33	*Social support*	*Emotional and practical social support*
44/ 45	*Job insecurity*	*Feel 'not very secure' or 'insecure' in current job (versus 'secure')*
44/ 45	*Stressful life events*	*1+ stressful life events experienced in prev 6 months*
7	*Family adversity*	*Prospectively assessed family adversities*
Child hood	*Parental alcohol problems*	*Either parent had 'trouble with drinking' in childhood, recalled age 44/ 45*
Child hood	*Parental mental health problems*	*Either parent had 'nervous or emotional trouble' in childhood, recalled at 44/ 45*

Table 8-13 underscores the observation that timing of exposure may be more important in accounting for mid-life common mental disorders, than the specific 'type' of exposure, as in each instance it appeared that material adversity experienced at age 7, 11 or 16 and family adversity at age 7 played the biggest role in mediating the excess risk of mid-life common mental disorders in second generation Irish people, in the sample. In addition, recalling having a parent who had alcohol problems in childhood (recalled at mid-life) also appeared to attenuate the association between Irish ethnicity and mid-life common mental disorders.

Do earlier exposures increase the risk of poorer self-rated health at mid-life in second generation Irish people?

The following tables, based on imputed data, present a similar set of mediation analyses for poorer self-rated health at mid-life in Irish cohort members. Complete case models are presented in Appendix G; Table 5.

Table 8-15: Association of parental migration history (Irish-born versus non-Irish) with poorer self-rated health at mid-life (age 44/ 45), in cohort members, taking into account material adversity, across the life-course

Models a-b: Adjusting for material adversity at mid-life (age 44/ 45, 42)

Covariate	Base-line Model OR	Adj. for gender and Irish ethnicity 95% CI	p value	Model a OR	Adj. for material adversity age 44/45 95% CI	p value	Model b OR	Adj. for material adversity age 42 95% CI	p value
2nd generation Irish	1.25	0.98,1.60	0.07	1.27	0.99,1.64	0.06	1.27	0.98,1.64	0.07
Female gender	1.02	0.91,1.14	0.77	1.00	0.89,1.12	0.94	0.91	0.81,1.02	0.11
Material adversity age 44/ 45									
In council housing	-	-	-	2.43	2.05,2.88	p<0.001	-	-	-
No car	-	-	-	1.04	0.80,1.34	0.77	-	-	-
Previously homeless	-	-	-	1.01	0.72,1.42	0.94	-	-	-
On benefits	-	-	-	0.81	0.70,0.93	p<0.001	-	-	-
Overcrowding	-	-	-	0.80	0.66,0.98	0.03	-	-	-
Financial difficulties	-	-	-	1.96	1.72,2.22	p<0.001	-	-	-
Unemployed	-	-	-	2.18	1.86,2.55	p<0.001	-	-	-
Material adversity, age 42									
No car	-	-	-	-	-	-	1.86	1.51,2.29	p<0.001
Difficulties paying bills	-	-	-	-	-	-	1.94	1.64,2.30	p<0.001
Can't afford food/ clothing	-	-	-	-	-	-	1.86	1.61,2.16	p<0.001

Models c-d: Adjusting for material adversity in early adulthood (age 23, 33)

Covariate	Base-line Model OR	Adj. for gender and Irish ethnicity 95% CI	p value	OR	Adj. for material adversity at age 33 95% CI	p value	OR	Adj. for material adversity at age 23 95% CI	p value
Second generation Irish	1.25	0.98,1.60	0.07	1.23	0.96,1.59	0.11	1.16	0.91,1.49	0.24
Female gender	1.02	0.91,1.14	0.77	1.03	0.92,1.16	0.59	0.94	0.84,1.06	0.32
Material adversity, age 23									
No/shared access to indoor toilet	-	-	-	-	-	-	1.10	0.76,1.60	0.62
No/shared access to indoor bathroom	-	-	-	-	-	-	1.22	0.78,1.93	0.38
Lives in council house	-	-	-	-	-	-	1.57	1.32,1.86	p<0.001
Has been homeless	-	-	-	-	-	-	1.23	0.95,1.59	0.11
Receiving benefits	-	-	-	-	-	-	1.59	1.37,1.83	p<0.001
Household crowding	-	-	-	-	-	-	1.56	1.12,2.19	0.01
Unemployed							1.19	0.97,1.47	0.10
Material adversity, age 33									
Unemployed	-	-	-	2.09	1.63,2.68	p<0.001	-	-	-
Household crowding	-	-	-	1.25	1.04,1.49	0.02	-	-	-
Bill arrears	-	-	-	1.82	1.32,2.51	p<0.001	-	-	-
No telephone	-	-	-	0.66	0.53,0.84	p<0.001	-	-	-

Covariate	Base-line Model OR	Adj. for gender and Irish ethnicity 95% CI	p value	OR	Adj. for material adversity at age 33 95% CI	p value	OR	Adj. for material adversity at age 23 95% CI	p value
Damp in housing	-	-	-	1.29	1.08,1.55	p<0.001	-	-	-
Lives in council house	-	-	-	2.03	1.71,2.41	p<0.001	-	-	-
No central heating	-	-	-	0.73	0.63,0.86	p<0.001	-	-	-
Reduced access to amenities	-	-	-	1.47	0.86,2.50	0.16	-	-	-

Models e: Adjusting for childhood material adversity (age 7, 11, 16)
See Appendix E Table 3 for models assessing mediation by childhood material adversity variables, broken down further by age (age 7, 11 or 16)

	Baseline model	**Adj. for gender and Irish ethnicity**		**Model e**	**Adj. for childhood adversity**	
Covariate	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
Second generation Irish	1.25	0.98,1.60	0.07	1.10	0.85,1.41	0.46
Female gender	1.02	0.91,1.14	0.77	1.00	0.89,1.12	0.99
Childhood adversity						
Household crowding once	-	-	-	1.22	1.01,1.47	0.03
Household crowding twice	-	-	-	1.25	1.04,1.50	0.02
Household crowding thrice	-	-	-	1.27	1.08,1.50	p<0.001
Financial difficulties once	-	-	-	1.41	1.17,1.71	p<0.001
Financial difficulties twice	-	-	-	1.82	1.34,2.49	p<0.001
Financial difficulties thrice	-	-	-	1.58	0.96,2.61	0.07
Free school meals once	-	-	-	1.09	0.86,1.38	0.45
Free school meals twice	-	-	-	1.16	0.85,1.59	0.35
No access to indoor toilet, bathroom, hot water at 7, 11 or 16	-	-	-	1.29	1.07,1.54	0.01

Table 8-16: Association of parental migration history (Irish-born versus non-Irish) with poorer self-rated health at mid-life (age 44/ 45), in cohort members, taking into account prior health-related behaviours (alcohol misuse and smoking), across the life-course

Models a-b: Adjustment for prior hazardous and harmful alcohol use

	Baseline model	**Adj. for gender and Irish ethnicity**		**Model a**	**Adj. for hazardous alcohol use**		**Model b**	**Adj. for harmful alcohol use**	
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
Second generation Irish	1.25	0.98,1.60	0.07	1.22	0.95,1.55	0.11	1.24	0.97,1.58	0.09
Female gender	1.02	0.91,1.14	0.77	1.10	0.98,1.23	0.11	1.11	0.99,1.24	0.09
Hazardous alcohol use, age 33, 42 (1+ on CAGE)									
On one occasion	-	-	-	1.31	1.13,1.51	p<0.001	-	-	-
On two occasions	-	-	-	1.56	1.34,1.81	p<0.001	-	-	-
Harmful alcohol use, age 44/ 45 *(8+ on AUDIT)*									
Harmful alcohol use at mid-life	-	-	-	-	-	-	1.43	1.26,1.64	p<0.001

Models c: Adjustment for prior smoking over the life-course

	Baseline model	**Adj. for gender and Irish ethnicity**		**Model c**	**Adj. for smoking**	
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
Second generation Irish	1.25	0.98,1.60	0.07	1.23	0.96,1.57	0.10
Female gender	1.02	0.91,1.14	0.77	1.04	0.93,1.16	0.53
Life-course smoking behaviours (age 23, 33, 42)						
Current or ex-smoker on at least one occasion	-	-	-	1.55	1.36,1.78	p<0.001

Table 8-17: Association of parental migration history (Irish-born versus non-Irish) with poorer self-rated health at mid-life (age 44/ 45), in cohort members, taking into account prior psychological health (in childhood and in adulthood) across the life-course

	Baseline model			**Adj. for gender and Irish ethnicity**			**Adj. for childhood psychological health†**			**Adj. for adult depression***		
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
Second generation Irish	1.25	0.98,1.60	0.07	1.20	0.94,1.53	0.15	1.20	0.94,1.55	0.15			
Female gender	1.02	0.91,1.14	0.77	1.09	0.98,1.22	0.13	0.86	0.77,0.97	0.01			
Childhood psychological health†	-	-	-	1.94	1.70,2.21	p<0.001	-	-	-			
Adult depression*	-	-	-	-	-		4.04	3.44,4.74	p<0.001			

***Key**: †Childhood internalising and externalising disorders were determined through the BSAG and the Rutter-B at age 7, 11 and 16; *Adult depression as assessed through the Malaise Inventory, on at least one occasion, 23 or 33*

Table 8-18: Association of parental migration history (Irish-born versus non-Irish) with poorer self-rated health at mid-life (age 44/ 45), in cohort members, after adjusting for prior poorer self-rated health

	Baseline model	**Adj. for gender and Irish ethnicity**			**Adj. for prior poorer self-rated health***	
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
Second generation Irish	1.25	0.98,1.60	0.07	1.35	1.03,1.77	0.03
Female gender	1.02	0.91,1.14	0.77	0.98	0.87,1.11	0.8
Previous poorer self-rated health*	-	-	-	8.93	7.88,10.13	p<0.001

Key: **Assessed at 23, 33 and 42*

Table 8-19: Association of parental migration history (Irish-born versus non-Irish) with poorer self-rated health at mid-life (age 44/ 45), in cohort members, taking into account social support across the life-course

Models a-b: Adjusting for social support at age 33 and at 42

	Baseline model	**Adj. for gender and Irish ethnicity**		**Model a**	**Adj. for social support* age 33**		**Model b**	**Adj. for social support** age 42**	
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
2nd generation Irish	1.25	0.98,1.60	0.07	1.24	0.97,1.58	0.09	1.25	0.98,1.59	0.07
Female gender	1.02	0.91,1.14	0.77	1.07	0.95,1.19	0.27	1.04	0.93,1.16	0.54
Emotional support*	-	-	-	0.85	0.70,1.03	0.09	-	-	-
Practical support*	-	-	-	0.78	0.64,0.95	0.01	-	-	-
Social support**	-	-	-	-	-	-	1.65	1.24,2.20	p<0.001

Key: **Medium to high (versus low) levels of emotional and practical social support; *Cohort member has no one to turn to for advice and support (versus has someone)*

Model c: Adjusting for social support at age 44/ 45

	Baseline model	**Adj. for gender and Irish ethnicity**		**Adj. for social support* age 44/ 45**		
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
Second generation Irish	1.25	0.98,1.60	0.07	1.27	0.99,1.62	0.06
Female gender	1.02	0.91,1.14	0.77	1.05	0.94,1.17	0.4
Social support* age 44/ 45						
Confiding emotional support	-	-	-	0.66	0.58,0.76	p<0.001
Practical support	-	-	-	1.12	0.99,1.28	0.08
Negative support	-	-	-	0.74	0.66,0.84	p<0.001

Key: **Social support assessed on the Close Person's Questionnaire- intermediate to high levels of confiding emotional and practical social support versus low levels, and low levels negative social support versus intermediate to high levels*

Table 8-20: Association of parental migration history (Irish-born versus non-Irish) with poorer self-rated health at mid-life (age 44/ 45), in cohort members, taking into account stressful life events and psychosocial adversity across the life-course

Models a-b: Adjusting for stressful life events in the previous six months and job insecurity at age 44/ 45

	Baseline model	**Adj. for gender and Irish ethnicity**		**Model a**	**Adj. for stressful life events***		**Model b**	**Adj. for job insecurity**	
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
Second generation Irish	1.25	0.98,1.60	0.07	1.24	0.97,1.59	0.08	1.26	0.98,1.61	0.07
Female gender	1.02	0.91,1.14	0.77	1.01	0.91,1.13	0.84	1.07	0.95,1.19	0.26
1+ stressful life events*	-	-	-	1.48	1.31,1.66	p<0.001	-	-	-
Feels not v. secure/ insecure (vs. secure) in current job	-	-	-	-	-	-	1.80	1.51,2.16	p<0.001

Key: **Stressful Life Events in the last six months were: cohort member or close relation suffering serious illnesses, injury/ assault, death of parent/ child/ partner, death of a close friend/ relative, end of a serious relationship or separation, serious problems with a close friend/ neighbour/ relative, serious disappointments at work, cohort member/ partner fears losing one's job, losing one's job, major financial crises, problems with the police, and experiences of theft. Responses were dichotomised into '0 stressful life events' vs. '1+ stressful life events'*

Model c: Adjusting for prospectively assessed family adversity at age 7

	Baseline model OR	**Adjusting for gender and Irish ethnicity 95% CI**	**p value**	**OR**	**Adjusting for family adversity* 95% CI**	**p value**
Second generation Irish	1.25	0.98,1.60	0.07	1.17	0.92,1.50	0.21
Female gender	1.02	0.91,1.14	0.77	1.01	0.90,1.13	0.88
One or more family difficulties*, age 7	-	-	-	1.64	1.40,1.91	p<0.001

Key: **'Family difficulties' as assessed by the Health Visitor at age 7, comprising one or more problems with: housing, finances, physical or mental illness/ disability, learning disabilities, death, divorce, parental separation, domestic tensions, in-law conflicts, unemployment, alcoholism, or 'any other difficulties affecting child's development'.*

Table 8-21: Association of parental migration history (Irish-born versus non-Irish) with mid-life poorer self-rated health, taking into account measures of parental psychological health and health-related behaviours, as recalled by cohort members at mid-life

	Baseline model	**Adjusting for gender and Irish ethnicity**		**Adjusting for parental nervous/ emotional trouble in childhood**			**Adjusting for parental alcohol problems in childhood**		
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
Second generation Irish	1.25	0.98,1.60	0.07	1.23	0.97,1.57	0.09	1.20	0.94,1.54	0.14
Female gender	1.02	0.91,1.14		1.00	0.90,1.12	1.00	1.01	0.90,1.12	0.91
Either parent had 'nervous or emotional trouble'*	-	-	-	1.32	1.17,1.49	<0.001	-	-	-
Either parent had 'trouble with drinking'*	-	-	-	-	-	-	1.36	1.17,1.59	<0.001

Key: **Recollections of childhood, cohort members were asked this question when they were aged 44/ 45*

As with mid-life common mental disorders, adverse exposure to material or familial adversity in childhood had the largest attenuation effects on the association between 2nd generation Irish status and poorer self-rated health at mid-life, as did material adversity assessed at age 23 (Table 8-15). Again, although adverse exposures such as alcohol misuse and tobacco use, poor social support, prior poor self-ratings of health or prior common mental disorders, stressful life events and job insecurity in adulthood each had strong associations with reporting poorer self-rated health at mid-life in the full sample, none of these appeared to mediate the association of second generation Irish status with poorer self-rated health at mid-life. Of note, unlike for mid-life common mental disorders, recalled parental problems with alcohol in childhood did not appear to mediate the association of second generation Irish status with mid-life poorer self-rated health, to the same extent which it had done for common mental disorders. Table 8-22 summarises findings further, grouping exposures according to timing.

Table 8-22: Association of parental migration history (Irish vs. non-Irish) with poorer self-rated health at age mid-life (age 44/ 45)

Age	Adjustments	OR	95% CI	p value
Baseline model: Association of ethnicity (Irish vs. non Irish) with poorer self-rated health at mid-life after adjusting for gender only				
44/ 45	Gender	1.25	0.98,1.60	0.07
Models adjusting for gender + material adversity across the life-course				
44/ 45	Material adversity	1.27	0.99,1.64	0.06
42	Material adversity	1.27	0.98,1.64	0.07
33	Material, adversity	1.23	0.96,1.59	0.11
23	Material adversity	1.16	0.91,1.49	0.24
7, 11, 16	Material adversity	1.10	0.85,1.41	0.46
Models adjusting for gender + health-related behaviours across the life-course				
44/ 45	Hazardous alcohol use	1.24	0.97,1.58	0.09
33, 42	Hazardous alcohol use	1.22	0.95,1.55	0.11
23, 33, 42	Life-course tobacco use	1.23	0.96,1.57	0.10
Models adjusting for gender + previous mental health across the life-course				
23, 33	Adult depression	1.20	0.94,1.55	0.15
7, 11, 16	Childhood emotional or behavioural health problems	1.20	0.94,1.53	0.15
Models adjusting for gender + previous poorer self-rated health				
23, 33, 42	Previous poorer self-rated health	1.35	1.03,1.77	0.03
Models adjusting for gender + social support across the life-course				
44/ 45	Social support	1.27	0.99,1.62	0.06
42	Social support	1.25	0.98,1.59	0.07
33	Social support	1.24	0.97,1.58	0.09
Models adjusting for gender + stressful life events across the life-course				
44/ 45	Job insecurity	1.26	0.98,1.61	0.07
44/ 45	Stressful life events	1.24	0.97,1.59	0.08
7	Family adversity	1.17	0.92,1.50	0.21
Models adjusting for gender and parental health in childhood				
Childhood	Parental alcohol problems	1.20	0.94,1.54	0.14
Childhood	Parental mental health problems	1.23	0.97,1.57	0.09

***Key**: Refer to Table 8-14 for full description of mediators used in analyses; see appendix for complete case tables*

Discussion

Main findings

The findings suggest that second generation Irish children born in the late 1950s experienced greater levels of childhood adversity than those of English, Scottish or Welsh heritage, although social and economic inequalities diminished between the two groups as the cohort entered mid-life. Despite improvements in material and social conditions by adulthood, an inheritance of poorer health at mid-life for second generation Irish people was evident, relative to the rest of the cohort. Childhood material and social adversity as well as early adulthood material adversity accounted for these differences, whereas health-related behaviours and earlier psychological health and self-rated health did not.

Second generation Irish cohort members had an elevated risk of common mental disorders in early adulthood (age 23) which had partially reduced by mid-life. In contrast, for poorer self-rated health, (also a predictor for mortality[73]), although there were no differences between second generation Irish cohort members and the rest of the cohort at earlier time-points, by mid-life differences had started to become apparent. In gender stratified analyses, there were no significant interactions or marked differences by gender in the risk of self-rated health over the life-course. For common mental disorders there was a trend for Irish women to have an elevated relative odds of common mental disorders at all of the time-points assessed, relative to women in the rest of the sample, although evidence of a gender*ethnicity interaction for this part of the analysis was not present.

The findings are consistent with a large body of evidence which has shown that childhood adversity exerts long range effects on a variety of adult health outcomes, including (but not limited to): mental health[120, 146, 325], self-rated health[51], mortality[34, 147], poorer cardiovascular health, dental health and substance abuse[35]. Studies using data from birth cohorts[35] (including those using data from the NCDS[146]) have shown that social class gradients in health

do not emerge exclusively in adulthood but have origins in childhood, and social and material adversity may accumulate in individuals both cross-sectionally and longitudinally, over time[146]. In the present study, there was evidence to suggest that Irish cohort members were more likely than the rest of the cohort to experience a concentration of adversity in childhood and in early adulthood; and that this to a certain extent, accounted for a greater risk of mid-life common mental disorders and poorer self-rated health, compared to the rest of the cohort. The findings of the present study are therefore in keeping with a 'sensitive period' in childhood/ early adulthood which continues to adversely influence adult health many years later[33], and may be relevant in understanding previously reported adult health inequalities experienced by second generation Irish people, despite apparent improvements in socioeconomic position across generations [9, 78][68]. This point is discussed further, in the concluding chapter of this thesis.

As discussed in Chapter 3 there are many possible mechanisms for the association of exposures experienced in childhood with later adult adverse health outcomes. For common mental disorders , earlier childhood psychological morbidity, childhood adversity (including family disruptions, health difficulties, neglect, parental divorce) as well as lower socioeconomic status of parents (which may increase the risk of other psychosocial risk factors such as reduced

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[68] In a further set of analyses, the 'accumulation' of adversity over the life-course was specifically assessed by adding up the number of times cohort members had been exposed to manual social class positions over the life-course. In the full sample, as expected there was evidence of a strong dose-response association between 'no. of times exposed to manual social class position' and both common mental disorders and poorer self-rated health, at mid-life. There were no interactions evident by Irish ethnicity, suggesting that whereas accumulation models of adversity were relevant to the full sample in accounting for poorer self-rated health and CMD at mid-life, this did not differ by ethnicity (See Table 2 in Appendix D).

parenting effectiveness) may increase the risk of later mental health problems in adulthood through 'pathway models', that is earlier adversities may lead to adverse intermediary processes (e.g. poor social relationships, social networks etc) which then increase the risk of later adult mental health problems. Similar processes may be at play for poorer self-rated health, although there may be differing mechanisms, as self-rated health is a measure of general well-being and so may encapsulate physical health as well as mental health ([34, 147]). As will be discussed in Chapter 10, future work could assess potential mechanisms more closely, using alternative analytic techniques such as Structural Equation Models (SEMs) (or 'path analysis').

Strengths and limitations

The data derives from a nationally representative sample from England, Scotland and Wales, therefore the findings are generalisable to second generation Irish people, now in mid-life. Most assessments were prospective, reducing the possibility of measurement bias. The possibility of reverse causality may have been an issue, as people who had poorer health at the earlier time-points may have been more likely to move into or stay in conditions of adversity. The isolated mediating effect of early life disadvantage is therefore striking, as one would have expected a larger contribution of adult social and material adversity in mediating differences.

It was not possible to assess exposures that may have been important in understanding the specific settlement experiences of Irish people living in Britain, as these were unavailable. These might include factors relating to migration and settlement, such as the pre-migration health of parents, reasons and circumstances surrounding migration[79] experiences of discrimination[79] and residential or neighbourhood contexts [116]. Future research should endeavour to understand how these factors operate within a life-course framework.

The findings from the previous chapter, which suggested a similar picture of Irish children being more likely to grow up in disadvantaged circumstances in the 1970 British birth cohort[326] suggests a degree of consistency across periods and cohorts. However, I cannot be sure if period-specific effects accounted for some of the findings, and this issue is discussed further in the last chapter of this thesis. In 1958 it was common for Irish people to experience overt discrimination, for example signs reading "*No Irish Need Apply*"[46], would have been frequently encountered when applying for employment or accommodation. By the time cohort members were aged 23 (1981) the conflict in Northern Ireland had escalated such that anti-Irish discrimination and issues relating to identity may have had a particular salience for second generation Irish people at that time[14]; this may have contributed to the mental health inequalities noted at this age, although it was not possible to discern this from the present analysis.

Assessment of the interaction of second generation Irish ethnicity with prior depression or poorer self-rated health did not suggest that Irish cohort members with either of these health problems were more likely to emigrate out of the cohort at later time-points. Previously commentators have suggested that the 'healthy migrant' paradox may be accounted for through migrants who are unwell emigrating back to their country of origin[76]. As a direct assessment of this assertion indicated, this was not the case for second generation Irish people in this study.

Missing data

Multiple imputation approaches used in this thesis to generate the final datasets used for analysis were based on an assumption that data was Missing At Random (MAR), that is "*any systematic difference between the missing values and the observed values can be explained by differences in observed data*"[321]. As discussed in the 'Methods' section, MI has the advantage of enabling a more efficient use of data and therefore improving the precision of final estimates, but may also deal with biases by including individuals in analyses who may have

been otherwise excluded if analyses were solely based on complete case assumptions[321].

For the overall models showing the association of Irish ethnicity with the mid-life health outcomes of common mental disorders and poorer self-rated health, effect sizes for associations were equivalent across complete case analyses and imputed datasets in the baseline models. In analyses of mediation, differences were noted in effect sizes, especially where data loss was more severe. Under the MAR assumption, multiple imputation would be expected to correct biases in complete-case analysis [316, 321]. The MAR assumption was made more plausible in these analyses through including a wide variety of predictive variables in the imputation regression equation, even where these variables were not used for the final analyses [316, 321, 327].

Relationship to historical context and policy implications

As I discussed in Chapter 2, in 1958, Irish citizens would have been subject to the recently instated 'common travel area', which enabled relatively informal migration between Ireland to Britain. Irish-born people migrating to Britain at this time took up employment in industries in which post-war labour shortages in Britain were greatest, this included the construction industry, domestic work, and nursing[16]. Adverse health outcomes previously noted in Irish-born migrants to Britain have been suggested to have been due to a relative lack of barrier to migration[3], alongside post-migration settlement experiences where work in transient and poorly paid employment was more likely[79]. The present analysis suggests mechanisms by which such inequalities were then 'transmitted' to the next generation.

I did not have prospective data to permit a direct examination of the childhood circumstances of Irish-born parents of cohort members. Irish-born migrants to Britain in the immediate post-war period were more likely to be shorter in height, and less well educated than both Irish people who stayed behind in Ireland, as well as English people living in England at this time[74]. This might

support the assertion that Irish-born migrants to Britain in the 1950s were selectively of poorer health[3, 74] and had experienced deprivation in their own childhood. Although I could not directly assess health and the childhood experiences of Irish-born parents of cohort members, findings from other cohorts have indicated that material adversity[216], as well as other risk factors for poorer adult health, such as birth weight, may 'transmit' across generations[328]. It has been suggested that the economic and social resources of parents may impact on the adult health of their offspring, through the exposure of offspring to environmental factors in early life[216], or that early childhood adversity may impact not only on later adult health, but also on the birth-weight of future offspring[329] In addition, a study of first and second generation ethnic minority women in Britain (women of Indian, Pakistani, Bangladeshi, Black Caribbean and Black African origin) found that the mean birth weight of first and second generation ethnic minority women was lower than that of white British women, with no evidence of an increase in birth weight across generations, despite it being known that these groups experience high levels of upward social mobility across generations[330].

Although by mid-life, the social circumstances of second generation Irish people were at parity with the rest of the cohort, an inheritance of growing up in adversity as a result of parental migration and settlement experiences has continued to influence downstream health outcomes. The relative non-specificity of childhood disadvantage in being detrimental to later health suggests important priorities for future research on the health of migrant groups now settling in Britain. Although the process of migration and settlement may mean that the experiences of relative social deprivation are transient [36, 227], tackling health inequalities in second generation groups may require concerted attention to childhood environments.

Finally, as I discussed in the literature review on social mobility, migration and common mental disorders in Chapter 4[36], these findings also underscore the importance of considering the life-course in its entirety, rather than taking

‘snapshot’ measures of socioeconomic position at single time-points, as it is clear that the experiences of adversity over the life-course have differed greatly for second generation Irish people, relative to their non-Irish counterparts.

Summary points

1. As summarised in Chapter 2, there is a large literature indicating that second generation Irish people continue to experience elevated mortality and morbidity, despite improvements in socioeconomic position over generations. Reasons for this are unknown.
2. In analyses presented in this chapter it was found that second generation Irish children were more likely to grow up under circumstances of marked material and social adversity relative to the rest of the cohort. By mid-life, second generation Irish cohort members were no longer more disadvantaged than the rest of the cohort, suggesting a degree of differential upward social mobility.
3. Yet, relative to the rest of the cohort, second generation Irish people experienced an elevated odds of common mental disorders and poorer self-rated health at mid-life. This diminished after adjusting for childhood disadvantage, as well as disadvantage at age 23.
4. The findings support the view that childhood adversity as well as (to an extent) adversity at age 23 continued to exert long range adverse effects on mid-life mental and physical health in second generation Irish people, despite this group being able to 'move out of' adversity by mid-life.

9 Chapter 9: Does social disadvantage over the life-course account for alcohol and tobacco use in second generation Irish people?

Introduction

In Chapter 2 I discussed the literature around alcohol and tobacco use in Irish-descended people living in Britain. As I suggested in this section, there has been a somewhat tacit assumption on the part of researchers that the previously reported inequalities in mortality, physical health and mental health in Irish people, are accounted for through an increased prevalence of damaging health-related behaviours such as alcohol misuse and tobacco use[64, 92]. Of two studies in which this has been examined directly, there was no evidence of mediation of health inequalities by alcohol, tobacco or other damaging health-related behaviours in Irish people[11, 55]. The findings that I presented in Chapter 8 are consistent with this earlier work in that alcohol misuse and tobacco use at earlier points in the life-course did not mediate the association between Irish ethnicity and poorer mid-life mental health or self-rated health[322]. However, these analyses were not especially detailed with respect to alcohol and tobacco use.

Undertaking a separate analysis of alcohol and tobacco use in second generation Irish men and women is of interest for a number of reasons. First, there has been very little work using good quality prospective data to assess patterns of alcohol and tobacco use in second generation Irish people[49, 96].

Second, physical health inequalities in second generation Irish people may lead to an increase in the risk of adverse health-related behaviours. It has been suggested that substances like alcohol and tobacco may be used for pain management or as a 'coping' strategy, for pre-existing mental health problems or chronic pain [49, 95, 96]. The

dataset provides a unique opportunity to directly assess this assertion, using good quality, prospectively collected longitudinal data.

Third, there has been some previous discussion over whether acculturative processes might influence patterns of alcohol or tobacco use in Irish-descended people (or other ethnic minorities) living in Britain (*see Chapter 2 for a discussion*). If acculturation is at play, then one would expect that these patterns of behaviour would come to resemble those of the receiving country population either over time or over generations. In this chapter I will directly assess the notion that health-related behaviours in migrant or ethnic minority groups may become more similar to that of the receiving country population over time, with a particular focus on second generation Irish people.

Finally, most previous work has tended to focus on Irish-born migrants[95] or the second generation are analysed grouped together with the first generation[6]. A further limitation of previous research has been in the use of cross-sectional analyses [3, 10, 11]. Using this dataset will therefore help to address these prior limitations.

To my knowledge, there have been no previous studies in which researchers have directly assessed if earlier experiences over the life-course such as childhood disadvantage or parental alcohol and tobacco use in childhood, mediate mid-life health-related behaviours in second generation Irish people. As suggested previously, identifying earlier mediating factors may be important if considering public health initiatives aimed at reducing later down-stream health inequalities.

Therefore, in this chapter I will present analyses in which alcohol use and misuse as well as tobacco use over the life-course in second generation Irish people will be examined, relative to the rest of the cohort. The primary objective will be to assess whether patterns of alcohol and tobacco use over the life-course in second generation Irish people growing up in Britain differ from the reference population. Secondary objectives will be to assess potential aetiological factors over the life-course which might account for any observed inequalities in health-related behaviours; specifically, the role of social disadvantage experienced over the life-course, prior poor

psychological health or poorer self-rated health, and alcohol misuse and tobacco use in the parents' of cohort members.

Methods

A full description of the analytic methods and main measures used in the analysis has been presented in Chapter 6. The main outcome measures for this part of the analysis were alcohol use as determined by the Alcohol Use Disorders Identification Test (AUDIT) with a cut-point of ≥8 indicated hazardous or harmful use of alcohol [302]. In addition, at age 44/ 45, if respondents reported if they had drunk "six or more (standard) drinks" in one sitting in the previous month, this indicated 'binge alcohol use'.

Other questions used to assess for harmful or hazardous alcohol use at earlier time points included the CAGE[69] and a question regarding the total amount of units consumed in the week prior to the survey. Further detail is given in Chapter 6 on the CAGE. Finally a question enquiring after abstention from alcohol use was also used in analyses as an outcome variable.

To assess tobacco use, cohort members were asked a simple question around 'current tobacco use' at all adult time-points (age 23, 33 and mid-life). Full details of all of these assessment tools are given in Chapter 6.

Analyses were conducted on a dataset which had been derived using multiple imputation using the chained equations approach ('*ICE*') in STATA [316]. The assumptions and procedures underlying multiple imputation are discussed in more detail in Chapter 6. All associations of second generation Irish ethnicity with outcomes have been stratified by gender in this chapter, with tests for statistical interaction presented wherever these were statistically significant.

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[69] The CAGE inventory asks: Have you wanted to **C**ut down your alcohol intake? Do you get **A**ngry if other people comment on your alcohol intake? Do you feel **G**uilty about your alcohol intake? Do you need an alcoholic drink first thing in the morning (**E**ye-opener) to get you going? (Ewing, 1984). Scores of >1 were taken to indicate hazardous alcohol use.

Results

Response rates in the adult sweeps of NCDS were as reported in the previous chapter, as were the reasons for non-response (see Chapter 8). After restricting the sample to second generation Irish respondents and cohort members without a parental history of migration, complete data was available for the AUDIT for 8671 individuals (92% of the biomedical sample), and on smoking in 9079 individuals (97% of the biomedical sample).

Patterns of alcohol and tobacco use over the life-course

Table 9-1 displays life-course alcohol use in second generation Irish cohort members. Compared to the rest of the cohort, second generation Irish men had an increased relative odds of harmful levels of alcohol use in early adulthood which had diminished by mid-life. Both second generation Irish men and women were more likely to report hazardous alcohol use relative to the rest of the cohort at age 33, although this risk had diminished by mid-life. At all time-points, second generation Irish women were more likely to report that they abstained from alcohol relative to other women in the cohort, although gender by ethnicity interactions were only significant for this outcome at age 42 (Table 9-1). At age 44/45 there was very little difference between Irish men and women and the rest of the cohort on AUDIT cut-offs, although second generation Irish men were more likely to report that they had binge drunk within the previous month relative to men in the rest of the cohort (OR: 1.45; 95% CI: 0.99 to 2.11; p=0.05) (Table 9-1). Stratified models assessing hazardous alcohol use at age 33 did not converge due to too few observations in some of the cells.

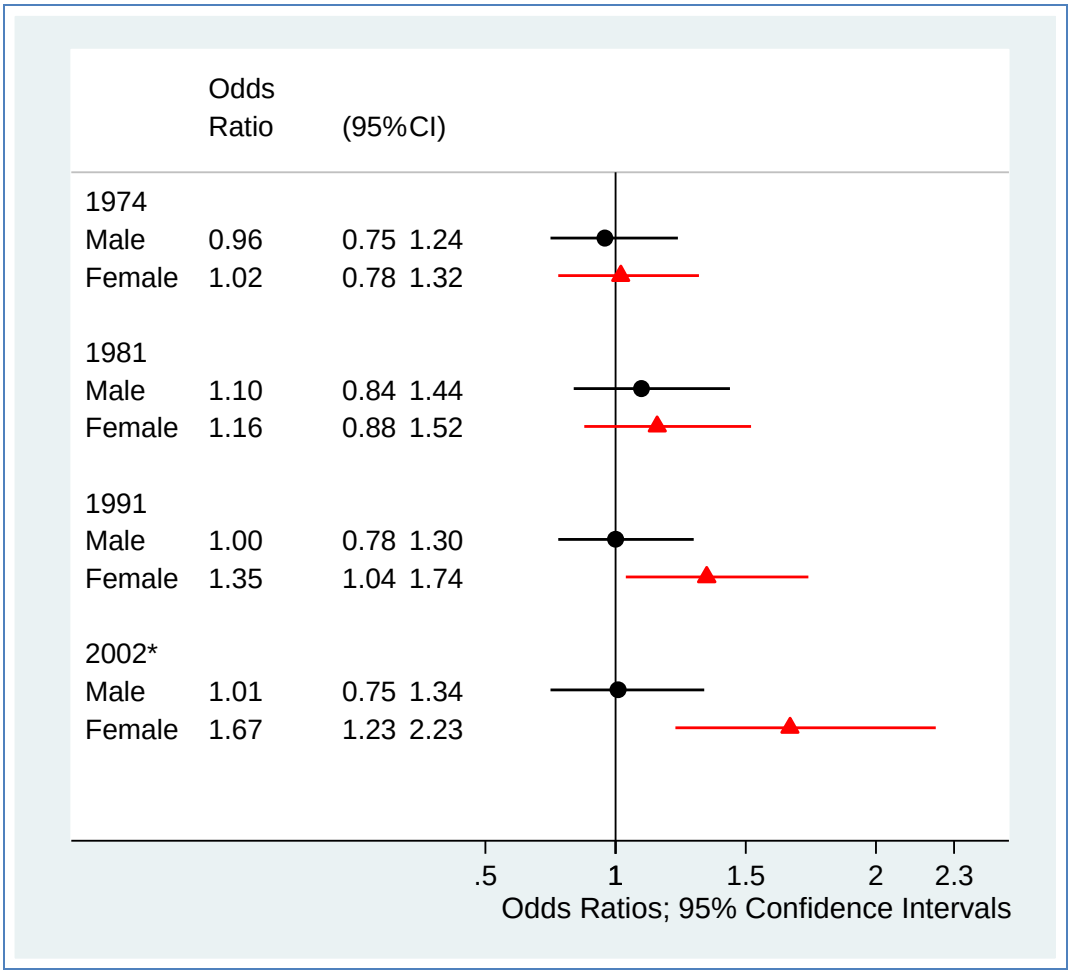
Table 9-1: Alcohol use in second generation Irish cohort members relative to the rest of the cohort

	N	Age	Year		OR	2nd gen Irish men*[1] (95% CI)	OR	2nd gen Irish women*[2] (95% CI)
Tried alcohol by age 16	9175	16	1974	Tried alcohol vs. not	0.95	0.52,1.74	0.65	0.43, 0.98
Harmful alcohol use	9436	23	1981	Drank >50 units last week	1.42	1.03,1.96	1.15	0.27, 4.85
	8877	42	2000	Drank >50 units last week	1.13	0.77,1.65	1.06	0.33, 3.40
Hazardous alcohol use	10095	33	1991	≥1 on CAGE	1.44	1.12,1.86	1.63	1.24, 2.15
	10091	42	2000	≥1 on CAGE	1.23	0.94,1.59	1.05	0.78, 1.40
Abstained from alcohol	11068	23	1981	Abstained	0.87	0.40,1.88	1.24	0.75, 2.05
	10135	33	1991	Abstained	0.51	0.16,1.59	1.38	0.84, 2.25
	10210	42	2000	Abstained	0.28	0.07,1.08	1.22	0.75, 1.99***
Mid-life drinking behaviours	7882	44/ 45	2002	Binge** alcohol use	1.45	0.99,2.11	1.15	0.86, 1.54
	7877	44/ 45	2002	≥8 on the AUDIT	1.09	0.82,1.45	1.24	0.86, 1.80

Key **[1]Relative to non-Irish men in cohort; *[2] Relative to non-Irish women in the cohort; ** Reported drinking 6+ drinks in one sitting in the previous month; *** Interactions with gender and ethnicity were noted for this outcome ($p<0.05$)*

Figure 9-1 displays the relative odds of reported tobacco use by Irish cohort members relative to the rest of the cohort, stratified by gender. Whereas second generation Irish men had similar patterns of smoking across all time-points compared with men in the reference population, there was strong evidence (p=0.02) that second generation Irish women were more likely to report either currently smoking or being an ex-smoker at mid-life, relative to women in the rest of the sample (Figure 9-1). Taking all adult time points together (age 23, 33, 42), second generation Irish women were 1.83 times more likely than women in the rest of the cohort to report being a smoker at least once (95% CI:1.14, 2.93; p=0.01), whereas this was OR: 1.29 (95%CI: 0.83, 2.02; p=0.26) in second generation Irish men.

Figure 9-1: Plot of relative odds of being a smoker/ ex-smoker vs. non-smoker in second generation Irish men and women relative to men and women in the rest of the cohort



Key: *Black circles indicate ORs in second generation Irish men relative to men in the non-Irish reference group; Red triangles indicate ORs in second generation Irish women relative to women in the non-Irish reference group. Horizontal lines indicate 95% CIs. Estimates falling on the vertical line indicate no difference between second generation Irish participants and the non-Irish reference group.*

**p value for interaction of gender with ethnicity: p=0.02*

Association of second generation Irish status with life-course adversity indicators

The association of second generation Irish status with material and social adversity indicators over the life-course was assessed, stratified by gender. In general, effect sizes as presented in Chapter 9 (*Figure 8-1: Odds ratios for social adversity across the life-course; Second generation Irish cohort members relative to non-Irish cohort members.*) across second generation Irish men and women were similar, although at age 33 second generation Irish women were less likely to have qualifications relative to women in the rest of the cohort[70]. As this part of the analysis involved multiple significance testing, caution should be exercised in interpreting this finding, due to the possibility of type I error.

Associations of exposures over the life-course with mid-life health-related behaviours

The following tables displays gender-adjusted associations of adverse experiences over the life-course, with the mid-life outcomes of binge alcohol use, AUDIT scores>8 and smoking. Strong associations were noted for most life-course adverse experiences with these dependent variables. The exception was that internalising disorders in childhood appeared to be protective against reporting binge alcohol use at mid-life (Table 9-2). In the full sample, second generation Irish cohort members were more likely to meet criteria for binge alcohol use (OR: 1.26; 95% CI: 1.00, 1.58) as well as report being current smokers (OR: 1.29; 95% CI: 1.00, 1.58) at mid-life, after adjusting for gender.

[70] Relative to men in the rest of the sample 2nd generation Irish men had an OR of 1.40 (95% CI: 0.87, 2.24) of reporting having qualifications at age 33, whereas this was OR 0.79 (95% CI: 0.55, 1.12) in 2nd generation Irish women (tests for statistical interaction; p=0.05).

Table 9-2: Associations of childhood adversity variables with health-related behaviours at mid-life in the full sample;

Univariate analyses; all models have been adjusted for gender

	Associations with binge alcohol use at age 44/ 45 (n=7882)			***Associations with scoring ≥8 on AUDIT at age 44/ 45 (n=7877)***			***Associations with smoking at age 44/ 45 (n=8220)***		
	OR	**95% CI**	**p**	**OR**	**95% CI**	**p**	**OR**	**95% CI**	**p**
Overcrowding (at least once, age 7, 11 or 16)	1.29	1.16,1.43	p<0.001	1.22	1.09,1.36	p<0.001	1.37	1.25,1.50	p<0.001
Restricted household amenities[1]	1.11	0.98,1.27	0.09	1.21	1.06,1.38	p<0.001	1.12	1.01,1.25	0.04
Family financial difficulties, age 7, 11 or 16	1.12	0.98,1.28	0.10	1.14	0.99,1.32	0.06	1.53	1.35,1.72	p<0.001
Family difficulties[2]	1.12	0.97,1.29	0.12	1.12	0.97,1.29	0.13	1.39	1.22,1.59	p<0.001
Recalled at 44/ 45: 'I grew up in poverty or financial hardship'	1.12	0.98,1.28	0.11	1.23	1.07,1.42	p<0.001	1.29	1.15,1.46	p<0.001

***Key**: [1]No sole access to indoor bathroom, toilet or hot water at least once, age 7, 11 or 16; [2] At least one of: housing, finances, physical illness/ disability, mental illness, learning disabilities, death of either parent, divorce/ separation, domestic tension, in-law conflicts, unemployment, alcoholism, or any 'other serious difficulties affecting child's development', assessed by health visitor at age 7*

Table 9-3: Associations of parental smoking, alcohol misuse and parental emotional health with cohort members' health-related behaviours at mid-life in the full sample; Univariate analyses; all models have been adjusted for gender

	Associations with binge alcohol use at age 44/ 45 (n=7882)			***Associations with scoring ≥8 on AUDIT at age 44/ 45 (n=7877)***			***Associations with smoking at age 44/ 45 (n=8220)***		
	OR	**95% CI**	**p**	**OR**	**95% CI**	**p**	**OR**	**95% CI**	**p**
Father smoked*	1.52	1.36,1.70	p<0.001	1.30	1.15,1.47	p<0.001	1.44	1.30,1.60	p<0.001
Mother smoked*	1.48	1.32,1.66	p<0.001	1.32	1.17,1.48	p<0.001	1.25	1.13,1.38	p<0.001
Either parent smoked*	1.68	1.49,1.89	p<0.001	1.42	1.24,1.63	p<0.001	1.53	1.37,1.70	p<0.001
Mother had alcohol problems, growing up**	1.51	1.18,1.92	p<0.001	1.76	1.39,2.24	p<0.001	1.32	1.06,1.64	0.01
Father had alcohol problems, growing up**	1.46	1.24,1.73	p<0.001	1.89	1.61,2.21	p<0.001	1.59	1.37,1.84	p<0.001
Either parent had alcohol problems, growing**	1.51	1.31,1.75	p<0.001	1.89	1.64,2.19	p<0.001	1.52	1.33,1.73	p<0.001
Mother suffered from emotional/ nervous trouble**	1.10	0.97,1.24	0.14	1.49	1.31,1.70	p<0.001	1.26	1.13,1.41	p<0.001
Father suffered from emotional/ nervous trouble**	1.03	0.88,1.21	0.69	1.11	0.94,1.32	0.23	1.07	0.92,1.23	0.39
Either parent had emotional/ nervous trouble**	1.05	0.94,1.18	0.36	1.35	1.20,1.52	p<0.001	1.16	1.05,1.28	p<0.001

Key: **prospectively assessed at age 16; ** recalled at age 44/ 45*

Table 9-4: Associations of childhood psychological health with health-related behaviours at mid-life in the full sample; Univariate analyses; all models have been adjusted for gender

	Associations with binge alcohol use at age 44/ 45 (n=7882)			***Associations with scoring ≥8 on AUDIT at age 44/ 45 (n=7877)***			***Associations with smoking at age 44/ 45 (n=8220)***		
	OR	**95% CI**	**p**	**OR**	**95% CI**	**p**	**OR**	**95% CI**	**p**
Childhood internalising problems at least once (age 7, 11, 16) vs. never	0.80	0.71,0.90	p<0.001	0.92	0.81,1.04	0.18	1.20	1.08,1.34	p<0.001
Childhood externalising problems at least once (age 7, 11, 16) vs. never	1.30	1.13,1.48	p<0.001	1.32	1.16,1.51	p<0.001	2.52	2.23,2.85	p<0.001

Table 9-5: Associations of material and social adversity indicators in early adulthood (age 23) with health-related behaviours at mid-life in the full sample; Univariate analyses; all models have been adjusted for gender

	Binge alcohol use at age 44/ 45 (n=7882)			***≥8 on AUDIT at age 44/ 45 (n=7877)***			***Smoking at age 44/ 45 (n=8220)***		
	OR	**95% CI**	**p**	**OR**	**95% CI**	**p**	**OR**	**95% CI**	**p**
Unemployed	1.27	1.04,1.56	0.02	1.54	1.27,1.87	p<0.001	1.85	1.54,2.22	p<0.001
In receipt of benefits	1.35	1.21,1.52	p<0.001	1.29	1.14,1.45	p<0.001	1.95	1.76,2.15	p<0.001
Homeless since last sweep	1.15	0.92,1.45	0.21	1.61	1.28,2.02	p<0.001	2.12	1.71,2.62	p<0.001
Resident in council housing	1.42	1.21,1.67	p<0.001	1.37	1.16,1.62	p<0.001	2.05	1.77,2.37	p<0.001
Restricted use indoor bath or shower	0.88	0.68,1.14	0.33	0.86	0.64,1.14	0.29	1.26	0.99,1.59	0.06
Sole access to indoor toilet	0.96	0.77,1.20	0.73	0.98	0.77,1.23	0.83	1.13	0.93,1.37	0.23
Household overcrowding	1.70	1.17,2.48	0.01	1.23	0.87,1.74	0.24	1.45	1.08,1.94	0.01

Table 9-6: Associations of material and social adversity indicators in early adulthood (age 33) with health-related behaviours at mid-life in the full sample; Univariate analyses; all models have been adjusted for gender

	Binge alcohol use at age 44/ 45 (n=7882)			***≥8 on AUDIT at age 44/ 45 (n=7877)***			***Smoking at age 44/ 45 (n=8220)***		
	OR	**95% CI**	**p**	**OR**	**95% CI**	**p**	**OR**	**95% CI**	**p**
Qualifications vs. none	0.72	0.60,0.87	p<0.001	0.77	0.64,0.92	p<0.001	0.39	0.33,0.46	p<0.001
Has central heating vs. none	0.96	0.83,1.11	0.55	0.82	0.71,0.95	0.01	0.64	0.56,0.73	p<0.001
Lives in social housing	1.44	1.23,1.69	p<0.001	1.29	1.10,1.51	p<0.001	2.76	2.38,3.21	p<0.001
Damp in housing	1.12	0.95,1.30	0.17	1.09	0.92,1.29	0.31	1.31	1.14,1.50	p<0.001
No access to telephone	1.05	0.84,1.32	0.67	1.34	1.07,1.69	0.01	2.56	2.04,3.20	p<0.001
In arrears with bills	1.69	1.17,2.42	p<0.001	1.79	1.27,2.52	p<0.001	3.31	2.33,4.70	p<0.001
Access to amenities	1.03	0.63,1.68	0.91	1.40	0.87,2.26	0.16	2.18	1.35,3.51	p<0.001
Household overcrowding	1.26	1.07,1.48	0.01	1.10	0.93,1.31	0.27	1.69	1.45,1.96	p<0.001
Unemployed	1.07	0.83,1.39	0.59	1.54	1.21,1.96	p<0.001	2.27	1.77,2.91	p<0.001

Table 9-7: Associations of material and social adversity indicators in early adulthood (mid-life) with health-related behaviours at mid-life in the full sample; *Univariate analyses; all models have been adjusted for gender.*

	Associations with binge alcohol use at age 44/ 45 (n=7882)			***Associations with scoring ≥8 on AUDIT at age 44/ 45 (n=7877)***			***Associations with smoking at age 44/ 45 (n=8220)***		
	OR	**95% CI**	**p value**	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
Household overcrowding*	1.01	0.85,1.20	0.90	0.76	0.64,0.89	p<0.001	1.06	0.92,1.23	0.42
Employed vs. unemployed *	0.78	0.67,0.89	p<0.001	1.22	1.03,1.44	0.02	1.48	1.30,1.69	p<0.001
Financial difficulties*	1.04	0.93,1.16	0.48	1.16	1.03,1.30	0.01	1.79	1.62,1.97	p<0.001
Receiving benefits*	0.94	0.84,1.05	0.25	0.79	0.71,0.88	p<0.001	0.94	0.85,1.03	0.19
Homeless since last sweep*	1.34	1.00,1.79	0.05	1.44	1.10,1.90	0.01	1.75	1.33,2.29	p<0.001
No car (vs. owns a car)*	1.43	1.13,1.81	p<0.001	1.50	1.22,1.83	p<0.001	1.32	1.09,1.59	p<0.001
Rents from housing association*	1.44	1.22,1.71	p<0.001	1.43	1.20,1.70	p<0.001	3.12	2.65,3.68	p<0.001
Job insecurity**	1.05	0.90,1.22	0.56	1.28	1.10,1.49	p<0.001	1.22	1.07,1.39	p<0.001
Does not own a car**	1.32	1.06,1.65	0.01	2.08	1.69,2.57	p<0.001	1.82	1.50,2.22	p<0.001
Money for food or clothing**	1.11	0.99,1.25	0.09	1.21	1.07,1.37	p<0.001	1.61	1.44,1.79	p<0.001
Difficulties meeting bill payments**	1.16	1.00,1.34	0.05	1.32	1.14,1.54	p<0.001	1.76	1.55,2.01	p<0.001
1+ Stressful life events, 6 months**	1.17	1.06,1.30	p<0.001	1.25	1.12,1.40	p<0.001	1.05	0.96,1.15	0.28

***Key**: *age 42; ** age 44/ 45*

Table 9-8: Associations of social support with health-related behaviours at mid-life in the full sample; Univariate analyses; all models have been adjusted for gender

	Associations with binge alcohol use at age 44/ 45 (n=7882)			***Associations with scoring ≥8 on AUDIT at age 44/ 45 (n=7877)***			***Associations with smoking at age 44/ 45 (n=8220)***		
	OR	**95% CI**	**p**	**OR**	**95% CI**	**p**	**OR**	**95% CI**	**p**
Practical social support[1], 33	0.97	0.84,1.12	0.67	0.88	0.76,1.02	0.10	0.74	0.65,0.85	p<0.001
Emotional social support[1], 33	0.96	0.83,1.11	0.57	0.89	0.77,1.03	0.11	0.81	0.71,0.92	p<0.001
Social support[2], 42	0.72	0.54,0.96	0.03	0.89	0.67,1.19	0.43	1.09	0.85,1.40	0.49
Negative social support[3], 44/ 45	0.98	0.89,1.08	0.68	1.16	1.04,1.29	0.01	1.04	0.95,1.14	0.39
Practical social support[3], 44/ 45	0.91	0.82,1.01	0.07	0.87	0.78,0.97	0.02	0.98	0.89,1.07	0.60
Confiding and emotional social support[3], 44/ 45	0.92	0.83,1.03	0.14	0.84	0.75,0.94	p<0.001	0.92	0.83,1.01	0.07

Key: *[1]'Medium high' versus 'low' emotional and practical social support; [2]Does the respondent have someone they could turn to for support; [3]Confiding, practical support and negative aspects of support from closest nominated person, assessed through Close Person's Questionnaire*

Table 9-9: Associations of mental health with health-related behaviours at mid-life in the full sample; Univariate analyses; all models have been adjusted for gender

	Associations with binge alcohol use at age 44/ 45 (n=7882)			***Associations with scoring ≥8 on AUDIT at age 44/ 45 (n=7877)***			***Associations with smoking at age 44/ 45 (n=8220)***		
	OR	**95% CI**	**p**	**OR**	**95% CI**	**p**	**OR**	**95% CI**	**p**
Adult psychological distress at least once vs. never (age 23, 33, 42) assessed through *Malaise Inventory*	1.20	1.05,1.37	0.01	1.81	1.57,2.08	p<0.001	1.90	1.68,2.15	p<0.001
Mid-life common mental disorders (age 44/ 45) assessed through CIS-R	1.17	1.00,1.36	0.05	1.71	1.46,2.00	p<0.001	1.43	1.25,1.65	p<0.001

Which life-course experiences mediate the association of Irish ethnicity with binge alcohol use at mid-life?

The role of life-course experiences in mediating differences between second generation Irish cohort members and the rest of the sample in binge alcohol use at mid-life (Table 9-10; Table 9-11; Table 9-12) are displayed next. Analyses assessing mediation for scoring 8 or more on the AUDIT at mid-life were not performed, as there were no differences noted between second generation Irish cohort members and the rest of the sample on this measure. The variables which comprised each of the putative mediators have been outlined in full in Table 9-14.

Table 9-10: Does material adversity over the life-course mediate the association between second generation Irish status and mid-life binge alcohol use?

	Second generation Irish (men and women)*		Second generation Irish men**		Second generation Irish women**	
	OR	**(95% CI)**	**OR**	**(95% CI)**	**OR**	**(95% CI)**
Baseline model						
Age 44/45	1.26	1.00,1.58	1.45	0.99,2.11	1.15	0.86, 1.54
Adjustment for material adversity indicators over the life-course						
Mid-life	1.25	1.00,1.58	1.47	1.01,2.14	1.13	0.84,1.52
Age 33	1.24	0.99,1.56	1.44	0.99,2.10	1.13	0.84, 1.52
Age 23	1.16	0.90,1.49	1.36	0.90,2.06	1.05	0.76, 1.45
Childhood	1.19	0.94,1.50	1.37	0.94,2.00	1.08	0.81, 1.46

Key: **Relative to the rest of the sample. All estimated displayed in this column have adjusted for gender.*

***Relative to men and women in the rest of the sample. See Table 9-14 for a full description of mediators.*

N=7882

Table 9-11: Does prior psychological health mediate the association between second generation Irish status and mid-life binge alcohol use?

	Second generation Irish (men and women)*		Second generation Irish men**		Second generation Irish women**	
	OR	**(95% CI)**	**OR**	**(95% CI)**	**OR**	**(95% CI)**
Baseline model						
Age 44/45	1.26	1.00,1.58	1.45	0.99,2.11	1.15	0.86, 1.54
Adulthood						
Mid-life CMD	1.25	1.00,1.57	1.45	0.99,2.11	1.14	0.85, 1.53
Early adulthood CMD	1.25	0.99,1.57	1.45	0.99,2.11	1.13	0.85, 1.52
Childhood						
Internalising disorders	1.27	1.01, 1.60	1.46	1.00,2.12	1.17	0.87, 1.56
Externalising disorders	1.24	0.99, 1.56	1.43	0.98, 2.08	1.14	0.85, 1.53

Key: **Relative to the rest of the sample. All estimated displayed in this column have adjusted for gender. **Relative to men and women in the rest of the sample. See Table 9-14 for a description of mediators. N=7882*

Table 9-12: Do parental health and parental health-related behaviours in childhood mediate the association between second generation Irish status and mid-life binge alcohol use?

	Second generation Irish (men and women)*		Second generation Irish men**		Second generation Irish women**	
	OR	**(95% CI)**	**OR**	**(95% CI)**	**OR**	**(95% CI)**
Baseline model						
Age 44/45	1.26	1.00,1.58	1.45	0.99,2.11	1.15	0.86, 1.54
Adjustment for parental mental health & alcohol problems in childhood						
Parent alcohol problems	1.20	0.95, 1.51	1.39	0.95, 2.02	1.10	0.82, 1.47
Parent emotional problems	1.25	1.00, 1.58	1.45	0.99, 2.10	1.14	0.85, 1.53

Key: **Relative to the rest of the sample. All estimated displayed in this column have adjusted for gender. **Relative to men and women in the rest of the sample. See Table 9-14 for a full description of mediators. N=7882*

Table 9-13: Does social support mediate the association between second generation Irish status and mid-life binge alcohol use?

	Second generation Irish (men and women)*		Second generation Irish men**		Second generation Irish women**	
	OR	**(95% CI)**	**OR**	**(95% CI)**	**OR**	**(95% CI)**
Baseline model						
Age 44/45	1.26	1.00,1.58	1.45	0.99,2.11	1.15	0.86, 1.54
Adjustment for social support						
Social support at age 33	1.26	1.00,1.58	1.44	0.99,2.10	1.15	0.86, 1.54
Social support at age 42	1.26	1.00,1.58	1.46	1.00,2.12	1.15	0.86, 1.54
Social support at age 44/ 45	1.26	1.00,1.58	1.45	0.99,2.11	1.15	0.86, 1.54

Key: **Relative to the rest of the sample. All estimated displayed in this column have adjusted for gender. **Relative to men and women in the rest of the sample. See Table 9-14 for a full description of mediators. N=7882*

Table 9-14: Full description of mediators used in analyses

Time period	Type of mediator	Variables
Mid-life Age 42 and 44/ 45	Material adversity	(Age 45) Difficulties meeting bill payments, Not enough money for food or clothing, Owns a car; (Age 42) Rents from LA or housing association vs. owner/ private rental, No car, Homeless since last sweep, Receiving benefits, Financial difficulties, Employment status, Household overcrowding
Early adulthood Age 33 and 23	Material adversity	(Age 33) Unemployed vs. not, household overcrowding, in arrears with bills, no access to phone, damp in housing, Resident in social housing, Lack of central heating in home, Qualifications (higher vs. none). (Age 23) Household overcrowding, Shared/ no access to indoor toilet, Shared/ no use of indoor bath or shower, Lives in council housing, Homeless since last sweep, In receipt of benefits, Unemployed.
Childhood Age 7, 11, 16	Material adversity	(Measure recalled at mid-life): 'I grew up in poverty or hardship'. (Age 7): Family difficulties assessed by health visitor, (Age 7, 11 or 16): Family financial difficulties, Restricted access to basic household amenities, Household overcrowding
Childhood (up to age 16)	Parental health-related behaviours	Parental alcohol use and tobacco use (recalled at age 44/ 45)
Adulthood (age 23, 33, 44/45)	Psychological health	Common mental disorders assessed through Malaise Inventory (age 23, 33) and Clinical Interview Schedule-Revised (CIS-R) (age 44/ 45)
Childhood (age 7, 11, 16)	Psychological health	Internalising and externalizing disorders assessed through Bristol Social Adjustment Guide (age 7, 11) and Rutter Teacher Scale (age 16)
Recalled at mid-life (age 44/ 45)	Parental health and parental health-related behaviours	Parental alcohol dependency, tobacco use and emotional problems enquired after when cohort members were aged 44/ 45
Age 33, 42 and 44/ 45	Social support	Age 33: Questions assessing emotional & practical support using questions from the Bristol Social Attitudes Survey. Age 42: Respondents asked who they could turn to for support. Age 44/ 45: Close Person's Questionnaire used.

The analyses displayed in Table 9-10 suggest that material adversity assessed in childhood and, to a certain extent, at age 23, partly mediated the association of second generation Irish status with mid-life binge alcohol use, in Irish men and in the full sample of second generation Irish people. Parental alcohol problems as recalled by cohort members at mid-life may have also partly mediated the association of 2nd generation Irish status with mid-life binge alcohol use in men however this was relatively modest (Table 9-12). Prior psychological health did not appear to account for much of the association between second generation Irish status and mid-life binge alcohol use (Table 9-11), nor did social support (Table 9-13).

Which life-course experiences mediate the association of Irish ethnicity with tobacco use at mid-life?

The following sets of tables show the association of second generation Irish status with mid-life tobacco use, also before and after adjusting for potential mediating variables. Refer back to table Table 9-14 for a full description of putative mediators.

Table 9-15: Does material adversity over the life-course mediate the association between second generation Irish status and mid-life tobacco use?

	Second generation Irish (men and women)*		Second generation Irish men**		Second generation Irish women**	
	OR	**(95% CI)**	**OR**	**(95% CI)**	**OR**	**(95% CI)**
Baseline model						
Age 44/ 45	1.29	1.05,1.58	1.01	0.75,1.34	1.67	1.24, 2.24
Adjustment for material adversity indicators over the life-course						
Mid-life	1.31	1.06,1.61	1.04	0.77, 1.39	1.67	1.23 2.26
Age 33	1.28	1.04,1.57	1.01	0.75,1.35	1.63	1.20, 2.21
Age 23	1.23	0.98,1.54	0.93	0.68,1.28	1.66	1.18, 2.23
Childhood	1.16	0.95, 1.43	0.90	0.67,1.21	1.51	1.12, 2.03

Key: **Relative to the rest of the sample. All estimated displayed in this column have adjusted for gender. **Relative to men and women in the rest of the sample. See Table 9-14 for a full description of mediators. N=8220*

Table 9-16: Does prior psychological morbidity over the life-course mediate the association between second generation Irish status and mid-life tobacco use?

	Second generation Irish (men and women)*		Second generation Irish men**		Second generation Irish women**	
	OR	**(95% CI)**	**OR**	**(95% CI)**	**OR**	**(95% CI)**
Baseline model						
Age 44/ 45	1.29	1.05,1.58	1.01	0.75,1.34	1.67	1.24, 2.24
Adulthood						
Mid-life CMD	1.28	1.05,1.58	1.01	0.76,1.35	1.64	1.22, 2.21
Early adulthood CMD	1.27	1.04,1.57	1.01	0.75,1.35	1.62	1.21, 2.19
Childhood						
Internalising disorders	1.28	1.04, 1.57	1.00	0.75, 1.34	1.65	1.23, 2.22
Externalising disorders	1.25	1.01,1.54	0.96	0.71, 1.29	1.62	1.20, 2.19

Key: **Relative to the rest of the sample. All estimated displayed in this column have adjusted for gender. **Relative to men and women in the rest of the sample. See Table 9-14 for a full description of mediators. N=8220*

Table 9-17: Do parental health and health behaviours mediate the association between second generation Irish status and mid-life tobacco use?

	Second generation Irish (men and women)*		Second generation Irish men**		Second generation Irish women**	
	OR	**(95% CI)**	**OR**	**(95% CI)**	**OR**	**(95% CI)**
Baseline model						
Age 44/ 45	1.29	1.05,1.58	1.01	0.75,1.34	1.67	1.24, 2.24
Adjustment for parental mental health and tobacco use in childhood						
Parent emotional problems	1.28	1.05, 1.57	1.00	0.75, 1.34	1.65	1.23, 2.22
Either parent smoked	1.25	1.02, 1.54	0.98	0.73, 1.31	1.61	1.19, 2.16

Key: **Relative to the rest of the sample. All estimated displayed in this column have adjusted for gender. **Relative to men and women in the rest of the sample. See Table 9-14 for a full description of mediators. N=8220*

Table 9-18: Does social support mediate the association between second generation Irish status and tobacco use at mid-life?

	Second generation Irish (men and women)*		Second generation Irish men**		Second generation Irish women**	
	OR	**(95% CI)**	**OR**	**(95% CI)**	**OR**	**(95% CI)**
Baseline model						
Age 44/45	1.29	1.05,1.58	1.01	0.75,1.34	1.67	1.24, 2.24
Adjustment for social support						
Social support at age 33	1.28	1.04,1.57	1.00	0.75,1.33	1.65	1.23, 2.22
Social support at age 42	1.29	1.05,1.58	1.00	0.75,1.34	1.67	1.24, 2.24
Social support at age 44/ 45	1.29	1.05,1.59	1.01	0.76,1.34	1.67	1.24, 2.24

As with mid-life binge alcohol use, material adversity in childhood appeared to mediate some of the association of second generation Irish ethnicity with mid-life tobacco use. The effect of adjusting for material adversity indicators at later time points (age 23 onwards) were more modest (Table 9-15). Of note, adjusting for childhood material adversity had a very modest impact on reducing the excess relative odds of smoking at mid-life in second generation Irish women relative to the rest of the sample. In addition, other experiences over the life-course, including prior psychological health (Table 9-16) parental smoking when cohort members were children (Table 9-17) and social support (Table 9-18) did not appear to mediate differences.

Main findings

Complex patterns of tobacco and alcohol use over the life-course in second generation Irish men and women were suggested by these findings. Second generation Irish men and women were more likely than the rest of the cohort to report harmful or hazardous alcohol behaviours in early adulthood, but this difference was reduced by mid-life. A relatively elevated prevalence of binge alcohol use at mid-life amongst second generation Irish men was also observed. High levels of abstention from alcohol were noted amongst second generation Irish women, consistent with the findings from one other study[107]. In this study, presented in more detail in Chapter 2, the authors noted high levels of abstention amongst Irish people living in Britain mixed with a picture of greater use amongst those who reported any alcohol use at all[107].

The odds of reported tobacco use amongst second generation Irish women relative to women in the rest of the cohort increased from 1991 to 2001; this trend was not seen for Irish men. This might indicate that health promotion messages and anti-tobacco legislation changes had failed to impact upon this group, a concern which has previously been raised for other ethnic minority groups[331].

Both Irish men and women were more likely than the rest of the cohort to grow up under circumstances of marked material disadvantage. In the previous chapter I showed that by adulthood, parity on most adversity measures had been reached for the full cohort. Assessment of 'gender' by 'Irish 2nd generation status' interactions with life-course adversity indicators suggested that second generation Irish women were more likely to be unqualified relative to women in the rest of the sample, although this was not the case for Irish men. Caution should be exercised in interpreting this finding due to the possibility of type 1 error; as this part of the analyses involved multiple significance testing.

As with the work that I presented in the previous chapter, these findings indicate that childhood disadvantage exerts long-range effects on mid-life health-related behaviours, and may go some of the way to explaining health inequalities experienced by second generation Irish cohort members. Other factors such as prior psychological health did

not appear to mediate the mid-life health-related behaviour association with Irish ethnicity. Similarly, parental health and health-related behaviours appeared to only partially mediate the association of adult health-related behaviours with second generation Irish status. For tobacco use at mid-life, childhood indicators partially mediated differences, although second generation Irish women continued to have an increased risk of smoking relative to women in the rest of the cohort, despite accounting for all putative mediating variables, including childhood material adversity. The findings of this study are in keeping with the wider literature in that childhood adversity indicators were consistently associated with mid-life tobacco, binge alcohol use and harmful/ hazardous alcohol use in the full sample. That these adversity indicators did not fully mediate the association between second generation Irish status and tobacco use at mid-life in women, warrants further investigation.

Finally, previous research and policy has tended to focus on Irish-born migrants[95, 96]. The present study lends credence to the observation that these health inequalities are not just limited to Irish-born migrants, but continue to be experienced by the second generation. In this respect, any acculturation over two generations has not led to an improvement in health-related behaviours. From a policy perspective the health needs of second generation Irish people may need to be prioritised.

Summary points

1. There have been no recent studies using good quality prospectively collected nationally representative data, to characterise patterns of alcohol and tobacco use over the life course in second generation Irish men and women.
2. Second generation Irish men were more likely to engage in harmful patterns of alcohol use at age 23 and both second generation Irish men and women reported hazardous patterns of alcohol use at age 23, however this excess risk had diminished by mid-life. At age 44/ 45 second generation Irish people were more likely to report patterns of binge alcohol use, relative to the rest of the cohort. Second generation Irish women were more likely than women in the rest of the cohort to report abstaining from alcohol at all time-points.
3. Whereas there were no differences in reported tobacco use between second generation Irish men and the rest of the sample at all time-points, second generation Irish women were more likely to report smoking at all time-points, with a suggestion of this difference accentuating over time.
4. Childhood disadvantage partially mediated the association between second generation Irish status and mid-life binge alcohol use and smoking. Parental alcohol problems in childhood partially mediated the association of second generation Irish status and mid-life binge alcohol use.

10 Discussion and conclusions

Introduction

In the following sections I will attempt to synthesise the main findings, specifically focusing on common themes, and the relationship of these findings to the background literature. I will conclude this chapter with a discussion of limitations and policy implications.

Overview of main findings

The first study assessed social and material health inequalities experienced by second generation Irish children born in Britain in 1958 and in 1970 respectively, relative to children of non-migrant parents. In particular, this study assessed the association of social and material circumstances (which might have been taken as indicative of 'settlement experiences') with the childhood mental health of second generation Irish cohort members, and with the health of their parents, relative to children of non-migrant parents. The results presented in Chapter 6 suggested that second generation Irish children born in 1958, and in 1970, were more likely to be born into stark material deprivation, relative to non-Irish respondents. Material deprivation appeared to account for the greater likelihood of Irish-born parents themselves experiencing either chronic physical health problems (NCDS) or psychological problems (BCS70), as well as second generation Irish cohort members experiencing psychological problems in childhood (both NCDS and BCS70). In turn, poorer psychological health in Irish-born mothers also mediated the association of 2nd generation Irish status with poorer childhood psychological health.

In the second study I assessed social and material inequalities across the life-course (from childhood through to mid-life) in the 1958 British Birth Cohort (NCDS), together with the prevalence of self-rated health and common mental disorders over the life-course. Second generation Irish cohort members were more likely to be born into material and social adversity and this continued to track into early adulthood (age 23,

and to a lesser extent, to 33). However, by mid-life (age 44, 45) parity had been reached on most social and material indicators, suggesting greater upward social mobility in Irish cohort members, compared to the rest of the study sample. In Irish cohort members relative to the rest of the cohort, an increased prevalence of common mental disorders in early adulthood (age 23) remained elevated over the adult life-course, although the extent of this difference had reduced slightly by mid-life. In contrast, self-rated health appeared similar in Irish cohort members relative to the rest of the sample at age 23 and 33. However, by mid-life inequalities in this measure had started to emerge. The latter finding is noteworthy as self-rated health is a predictor for mortality[73], which is elevated in Irish-descended people, despite improvements in socioeconomic position across generations[9]. As with the first study, childhood adversity mediated differences between 2nd generation Irish status and mid-life common mental disorders and self-rated health.

In the final study I assessed social and material adversity over the life-course, stratified by gender, and the associations of this with alcohol and tobacco use. The findings in this study, relating to tobacco use over the life-course appeared to differ by gender. Whereas Irish men had similar patterns of tobacco use to the rest of the cohort at all adult time-points (age 23, 33, and mid-life), Irish women were more likely to use tobacco, compared to women in the rest of the cohort, with this excess difference being greatest at mid-life. For alcohol use, the picture was equally complex. Whereas second generation Irish women were more likely to report abstaining from alcohol use relative to women in the rest of the cohort, second generation Irish men were more likely to report binge alcohol use at mid-life, relative to men in the rest of the cohort. In this study, childhood material and social disadvantage partially mediated the association of 2nd generation Irish status with mid-life binge alcohol use and tobacco use, with association of mid-life smoking continuing to remain fairly elevated in 2nd generation Irish women despite accounting for all mediators.

Relationship of morbidity findings to the wider literature

In this section I will summarise how findings relating to each of the main health outcomes in this thesis relate to the broader literature on health in Irish-descended people.

Childhood mental health

As discussed in Chapter 2, very few studies have examined psychological health in second generation Irish children growing up in Britain. Prevalence estimates of psychological morbidity in Irish children can be gleaned from larger reports on ethnic minority health in Britain, where samples of Irish children have been included, and have not suggested large differences [6, 91]. One previous study examined the health of Irish-descended children in the West of Scotland, and found that psychological morbidity was similar to the rest of the population, despite Irish-descended children living in adverse material circumstances[90].

The findings from this thesis contrast with previous work, in that it was found that relative to non-Irish children in the 1958 and 1970 birth cohorts, Irish children had an increased prevalence of childhood psychological morbidity, at age 7, 11 and 16 in NCDS and at 16 in BCS70. It may be that differences observed in the present study compared to previous work relate to period or cohort effects which may have impacted on Irish children growing up in Britain in the 1960s and 1970s.

It was noteworthy that material hardship and maternal depression mediated observed differences. Moreover, after taking into account maternal psychological health and covariates from birth (maternal age, education, paternal social class), Irish children in BCS70 at age 16 had a reduced risk of psychological morbidity relative to the rest of the population. The observation that in certain instances, ethnic minority children growing up in Britain may have better health (despite living in adversity) has been noted in a previous systematic review[262]. The findings from this thesis make a novel contribution to the literature as there have previously been very few studies examining aetiological mechanisms accounting for psychological morbidity in Irish children or in children of other ethnic minority backgrounds[262].

Self-rated health

As discussed in Chapter 2, the literature on self-rated health in Irish people living in Britain has not always been consistent. Whereas the Health Surveys for England have suggested that after adjustment for age and gender the health of Irish people is comparable to that of the rest of the population[6], other studies have suggested that Irish people (including second and later generation Irish people) are more likely to rate their health as poor, relative to the rest of the population in the reference groups [47].

One study of Irish-descended people in Scotland (most likely representing third and later generations) found that with increasing age, older Irish-descended people were more likely to rate their health as poor, relative to the rest of the population, suggesting an age/ ethnicity interaction (although this was not formally assessed in the study) [31]. The finding in this thesis, which suggested an increased risk amongst second generation Irish people of reporting poorer self-rated health with increasing age (relative to non Irish cohort members)[322], is consistent with this latter finding.

The present analysis suggested a role for social adversity in childhood continuing to have a long-term adverse effect on self-rated health many years downstream[322]. If self-rated health is taken to be a predictor of mortality[73], then this finding is consistent with one other study (also from the West of Scotland) which found that proxy measures assessing recalled childhood disadvantage[71] partially mediated the excess relative risk of mortality in Irish-descended men, relative to non-Irish men [11]. The findings from this thesis differ from the West of Scotland findings, as I was able to use detailed prospective assessment of adversity over the life-course, at multiple time-points in my analyses [322] (in contrast to a few recalled measures in adulthood[11]).

[71] Assessed through paternal social class, cumulative social class, number of siblings and school leaving age in this study (Abbotts et al, 1999).

Common mental disorders

As discussed in Chapter 2, most previous work (including one noteworthy study which specifically assessed risk factors relating to migration and settlement[79]) have tended to focus on prevalence and aetiological mechanisms of common mental disorders in Irish-born migrants only. The literature on second generation Irish mental health is sparse. Where second generation Irish people have been considered, they have been analysed grouped together with Irish-born (first generation) migrants [77, 78, 116]. A failure to find interaction effects by generational status may have been due to inadequate power to detect differences in these studies[77, 116]. In addition, the literature on childhood adversity and adult mental health in Irish people is also sparse, mainly supported by accounts from qualitative research, which have suggested that mental health problems in Irish-born people may have been associated with experiences of abuse[45, 95] or the loss of a parent[45], in childhood.

Therefore the findings in this thesis on common mental disorders in second generation Irish people, with a detailed prospective assessment of childhood adversity, makes an important contribution to the literature. In keeping with some of the life-course epidemiological studies reviewed in Chapter 3, both psychosocial adversity and material disadvantage in childhood appeared to mediate the excess risk of common mental disorders at mid-life in second generation Irish cohort members. The timing of exposure, as opposed to type of exposure, played a bigger part in accounting for differences in mid-life mental health problems.

Alcohol misuse did not mediate or account for the excess risk of common mental disorders in second generation Irish people at mid-life[322], despite evidence for an elevated prevalence of harmful and hazardous use in early adulthood (Chapter 8). This is a significant finding as authors of previous theoretical and empirical work have suggested that alcohol misuse may account for elevated psychiatric morbidity in Irish people[44, 79]. This difference may be due to the prospective nature of the present study and that it comprised only people of second generation Irish descent. Recall bias, which may have been a problem in previous work using a case-control or cross sectional design, are less likely in the current study. The finding- that alcohol misuse

did not mediate mental health differences in Irish cohort members- is consistent with work from the west of Scotland, in which it was also found that alcohol misuse did not mediate an excess risk of depression in Irish descended people[41].

Finally 'psychosocial' stressors such as stressful life events, job insecurity and social support, in adulthood also did not mediate associations between 2nd generation Irish status and mid-life common mental disorders, although 'family adversity'[72] assessed at age 7 did. Recalling that a parent had alcohol problems in childhood also appeared to mediate the association of 2nd generation Irish status with mid-life CMD, whereas adjusting for the variable 'recalling that a parent had emotional problems in childhood' had only a modest impact on attenuating associations. This might support the view that parental alcohol problems and some of the exposures which made up the family adversity measure (e.g. divorce or parental separation) may have long-lasting effects on the risk of down-stream mental health problems[73][332]. The findings also support a 'sensitive period' model in the aetiology of common mental disorders in second generation Irish cohort members, which is detailed further, below.

Alcohol use and misuse

Investigators have considered the role of acculturation across time or generations in accounting for health-related behaviours such as alcohol and tobacco use in Irish-descended people [55, 333]. As discussed in Chapter 2, investigators using acculturation theory presume that behaviours in migrants or ethnic minority groups may come to

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[72] 'Family difficulties' at age 7 were problems with: housing, finances, physical or mental illness/disability, learning disabilities, death, divorce, parental separation, domestic tensions, in-law conflicts, unemployment, alcoholism or any other difficulties 'affecting the child's development'.

[73] Different types of childhood adversity may have different effects on later mental health risk; for example loss of a parent through death does not increase the risk of later adult depression (after adjustment for confounders) to the same extent which parental loss through divorce or separation does (Tennant, 1991). Unfortunately, the low number of cases meant that it was not possible to tease apart the health associations of the different individual adversities comprising the 'family difficulties' variable in a meaningful way.

approximate to that of the receiving country either over time (for example in 'time since settlement') or across generations (e.g. later generations of ethnic minority people may show behaviours closer to that of the receiving country relative to earlier generations [56, 119]).

Previous work suggests that patterns of alcohol use in second and later Irish-descended people closely approximate to that of the host country[106, 107], supporting the view of acculturative changes over generations. In one other study using *Health Survey for England* data, the authors found that second generation Irish people were more likely to report 'any alcohol use' relative to the first generation, although the authors in this study did not directly compare the prevalence of alcohol use in first/ second generation Irish people to the white non-Irish reference population [55][74].

In this study I have been able to directly assess if alcohol and tobacco use in second generation Irish people is similar to, or diverges from the rest of the cohort (presumed to represent a white British non-Irish reference population), over the life-course. My findings support a view that acculturative processes have not occurred and that second generation Irish people have behaviours that diverge from those of the reference population. The analyses of mediation supported the view that parental alcohol misuse as well as childhood adversity and adversity at age 23, partially mediated mid-life binge alcohol use in Irish cohort members, whereas previous psychological morbidity (in childhood and in adulthood) did not.

Finally, if abstinence is presumed as reflecting cultural attitudes towards alcohol use[107], then the finding that second generation Irish women were more likely to report abstaining from alcohol relative to women in the rest of the cohort at all time points, might support the view that some culturally-specific behaviours have resisted change even in Irish people born and raised in Britain.

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[74] Although the magnitude of difference and strength of association for the outcome 'any alcohol use' in other second generation groups relative to first generation were larger and stronger in all other ethnic minorities surveyed in this study, than in the Irish group (Smith et al, 2009).

Tobacco use

Smoking follows a clear social class gradient, and has been strongly implicated in patterning health inequalities[334]. The authors of a recent analysis suggested that tobacco companies overtly use this knowledge in their marketing strategies, for example targeting advertising at working class women, who are viewed as constituting a potential 'growth market'[334]. Within this context, then, there are concerns that public health strategies aimed at reducing tobacco use in the wider population may not have an equitable coverage, missing in particular certain ethnic minority groups, who may not have reduced tobacco use to an equivalent extent as the wider population in England[331].

The literature that I reviewed in Chapter 2 tended to support a higher level of tobacco use in first and second generation Irish people in England [55] and this has been implicated in the mortality disadvantage experienced by Irish people[19, 65], with a high proportion of deaths from lung cancers[57, 65]. However, as I also highlighted in the literature reviews in Chapter 2, the issue of whether smoking 'accounts' for health inequalities in Irish people has been as controversial as the associated literature on alcohol use[92]. In particular, commentators fear that a focus on health-related behaviours in 'accounting' for ethnic minority (or Irish) health inequalities may lead to an assumption that Irish 'culture' is in some way to 'blame' for observed health inequalities[92, 335].

In Chapter 8 I presented analyses examining self-rated health at mid-life in second generation Irish people. In this analysis I did not find evidence to support the view that tobacco use mediated the association between ethnicity (second generation Irish vs. the rest of the cohort) and mid-life poorer self-rated health[322]. My findings are in keeping with one other study, in which the authors found that smoking accounted for poorer lung function in Irish-descended people in Scotland[41], although did not fully account for other observed health inequalities.

The findings in my thesis make a novel contribution to the literature and raise some areas of concern. First, unlike previous investigators, I was able to examine the

prevalence of tobacco use at multiple time-points over the life-course in second generation Irish men and women, relative to a reference population. Unlike previous work, my findings suggested a complex gendered picture. Although the full sample were more likely to report smoking at mid-life relative to the reference population (OR: 1.29 (95% CI: 1.05, 1.58), this was mostly accounted for by second generation Irish women as gender stratified analyses suggested that second generation Irish men were just as likely to report smoking as the reference population at all of the ages/ time-points assessed (age 23, 33 and 44/ 45), whereas second generation Irish women had a 1.67-fold increase in odds of reporting smoking relative to women in the reference population (95% CI: 1.23, 2.23)), at mid-life.

Second, I was able to assess if life-course adversity, prior mental health and parental smoking and health mediated excess tobacco use in second generation Irish people at mid-life, relative to a reference population. The findings from this part of the analysis supported the view that childhood adversity only partially accounted for the excess risk of reporting smoking at mid-life by Irish women (relative to women in the rest of the sample), whereas other potential mediators such as prior psychological health or parental smoking in childhood did not. This latter finding supports the view that there may be other potential mediators which will need to be considered in future analyses of smoking in second generation Irish people. In addition, these findings are in keeping with the view that some sections of the population have not benefited from policies targeting tobacco cessation to the same extent[331].

Significant themes

In the following section I will discuss several themes that were consistent across all of the studies reported in Chapters 7 to 9.

Social mobility in the cohort: Relationship to previous literature

In Chapter 2 I discussed literature in which it has been suggested that second generation Irish people, along with other ethnic minority groups in Britain[53, 156], may experience greater differential upward social mobility relative to the white British population. In keeping with the evidence that I reviewed in Chapter 4, it has been

suggested that first generation migrants experience downward social mobility on migration to Britain, but that their children benefit from their parents' aspirations (which may have influenced the decision to migrate) and is largely explained by educational achievement[53]. It has also been suggested that poverty may be experienced by many migrant families as an inevitable part of the settlement process in a new host country- such that the experience of poverty is a transient one for the children of migrant parents, unlike non-migrant children[227]. It has been shown that second generation Irish people attain educational qualifications equivalent to, or better than, their white British counterparts [7, 52], leading commentators to consider the role of Catholic schools in enhancing educational attainment and social mobility in Irish children[7].

In Chapter 4 I presented the findings of a systematic review and meta-analysis[36] which examined social mobility in migrant and second generation ethnic minority groups, and the association of this with common mental disorders. The literature supported the view that first generation migrants frequently pay an 'occupational penalty' or experience downward social mobility, in order to be able to migrate internationally for work[36]. In the meta-analysis, downward social mobility was associated with an elevated odds of common mental disorders, especially in refugee and asylum seeker groups[36]. Although only two studies in this review examined these processes in second generation groups [52, 53], both suggested that second generation minority ethnic children experienced greater differential upward social mobility, and that this protected against later common mental disorders in adulthood [36].

In Chapter 7 the analyses confirmed that second generation Irish children were more likely to be born into circumstances of marked material disadvantage, and that this was evident in both birth cohorts, despite the cohorts being separated by more than a decade. Unfortunately, I was unable to make a detailed assessment of parents' pre-migration histories and so it was not possible to assess whether Irish-born parents of study participants in the two birth cohorts had experienced 'downward mobility' on migrating to Britain to take up work. Although I could not assess this directly, there is some literature detailing Irish migration to Britain during this time period. In a report using

data from nationally representative health surveys from Ireland and England, the authors found that Irish-born migrants to England born in the period 1920-1960 were of a lower educational background and of shorter stature than both Irish people who remained behind in Ireland and English people in England[74]. The authors suggest that this might support the assertion that Irish-born migrants were selectively of a more disadvantaged socioeconomic background, with the Ireland-to-England migration flow being principally driven by a large wage gap differential, as well as high unemployment rates in Ireland relative to England[74]. Previous qualitative work on older Irish-born people has also suggested that one of the main 'push' factors in promoting emigration, reported by many older Irish-born migrants (arriving in Britain in the 1940s/ 1950s), was widespread poverty and a lack of economic opportunity in Ireland[43], whereas 'pull' factors for emigration to Britain (over other destinations) would have been its geographical and cultural proximity as well as relative lack of barriers to migration. Work by Heath and Ridge suggested that Irish-born men migrating to Britain for work at this time experienced downward social mobility[336]. They caution however, that this mobility pattern may be a reflection of movement from work in an agricultural/ farming setting to a industrial setting where attempting to assess social mobility, contingent on migration from one country to another, may not be straightforward[336]. For example, men moving from farming to industrial factory work may experience an improvement in income, however will also experience a loss of autonomy in moving from farming to manual work in a factory[336]. Heath & Ridge suggest that migration from Ireland to Britain was characterised by men coming from rural economies with poorer educational systems to industrial jobs in Britain not requiring qualifications or skills[336]. Irish-born migrants may have been more likely to have taken up these positions if they believed that these jobs were short-term and provided an income that would enable eventual emigration back to Ireland, where they would be able to use this income to buy land and housing[336][75].

[75] Although note, however, 'the myth of return' where far fewer Irish-born migrants actually managed to return to Ireland despite believing that this would eventually be possible (336. Heath, A. and J. Ridge, *Social mobility of ethnic minorities.* Journal of Biosocial Science, 1983.

Taking the evidence from previous work together with the findings in this thesis, it is likely that social disadvantage had already spanned more than one generation in this cohort, with the parents of second generation Irish cohort members potentially having experienced social disadvantage in their own childhoods, although it was not possible to assess this assertion directly.

In this respect, then, the findings outlined in Chapters 8 and 9, are of some interest. The analyses examining experiences of social disadvantage over the life-course (from birth to adulthood) in the 1958 birth cohort suggested that second generation Irish people experienced parity by mid-life on most social and adversity indicators. This is of interest, as the high levels of differential upward social mobility frequently observed in second generation ethnic minority groups has been attributed to the high levels of social, economic and human capital which migrant parents bring with them to the new country[337]. Although first generation migrant parents may 'migrate into' poverty, this may be transient[227, 337], and part of the 'occupational' and social penalty that families pay in order to migrate[36]. In other words, it may 'appear' that migrant families live in poverty, but their experiences of this are not comparable to that of the receiving country population, as aspirations and potential resources to move out of poverty differ[337]; for example it is possible that they may have higher educational qualifications and technical expertise, albeit from the sending country[36].

Therefore, if Irish-born parents were relatively depleted in economic, social and human capital, and came from disadvantaged backgrounds themselves, then the high levels of differential upward social mobility observed in their children (the sample of second generation Irish people in this study) is all the more remarkable. It may be that other factors play as an important role in promoting intergenerational social mobility, such as social capital, ethnic density, and familial/ psychological factors. It was not possible in the present study to disentangle reasons for the observed social mobility patterns within

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15(SupplementS8): p. 169-184.) This impacted negatively on mental health (43. Leavey, G., S. Sembhi, and G. Livingston, *Older Irish migrants living in London: identity, loss and return.* Journal of Ethnic and Migration Studies, 2004. **30**(4): p. 763 - 779.)

the cohort, although this could be a focus for future research[55]. Although there was a suggestion that 2nd generation Irish women were less likely to have qualifications at 33 relative to women in the rest of the sample (whereas parity on this indicator had been reached for 2nd generation Irish men), a concern is that this finding was as a result of multiple statistical testing and so may have been due to a potential type 1 error[76].

Relationship of social mobility to health outcomes

As discussed in Chapter 3, studies using cohort data have suggested that upward social mobility does not protect against the effect of childhood adversity on a range of health outcomes in adulthood[35]. With respect to common mental disorders, the findings from my systematic review (Chapter 4) suggested that upward social mobility in second generation ethnic minority groups may have a 'protective' effect on the risk of developing common mental disorders in later life[36].

Therefore, one may presume that the net effect of upward social mobility in Irish cohort members in the 1958 birth cohort might have been to mitigate against the effects which prolonged exposure to adversity over the life-course, might have otherwise had. However, in keeping with the findings reported by Poulton *et al*[35], this did not fully negate the effects of childhood adversity on poorer health outcomes downstream in Irish cohort members [322](Chapters 8 and 9). Future work could specifically assess accumulation versus sensitive periods and a social mobility model[158] in this dataset.

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[76] If the finding relating to qualifications was not an artefact of multiple significance testing, one may suppose that if education plays a strong part in promoting social mobility, and if Catholic schools played a part in enhancing this process amongst Irish-descended children living in Britain (*see for example:* 338.Hickman, M.J., *Integration or Segregation? The Education of the Irish in Britain in Roman Catholic Voluntary-Aided Schools.* British Journal of Sociology of Education, 1993. **14**(3): p. 285-300.), then this may not have been observed to the same extent across both genders. It may be that strong traditionally conservative views and expectations about the role of women played a part in accounting for this. Further work is needed to understand this better.

Characteristics of life-course adversity in Irish cohort members

A common theme across the studies was the observation that adversity tended to 'cluster' [339] in second generation Irish cohort members. The 'clustering' of adversity spanned all domains- from material hardship (relating to financial, type of housing and housing conditions), to health problems/ problems with substance misuse in parents of Irish cohort members, to familial difficulties, and to later problems in early adulthood relating to employment and housing. Irish cohort members experienced marked adversity throughout all childhood (age 7, 11, 16 in NCDS and 5, 10, 16 in BCS70) time-points, and this tracked into early adulthood (age 23 and to a certain extent, 33 in NCDS). As discussed in Chapter 3, this feature of adversity clustering in individuals has been described previously [130, 133, 340], and is not altogether unexpected. As discussed in the previous section on social mobility, the dissolution of these relative differences in experiences of adversity over the life-course, by mid-life in Irish cohort members, was notable and in contrast to wider findings[164, 339]. Instead, the findings support a more positive picture of the ability to 'move out' of the trajectory of accumulated adversity, amongst second generation Irish cohort members, discussed at length in the previous section on social mobility.

In considering these results one should also consider the possibility that rather than second generation Irish cohort members reaching parity on social and material indicators by mid-life, the results were an artefact of the measures used and in particular a result of secular trends. The table in the appendix (Appendix H, Table 6) shows that, indeed, for **some** measures, (e.g. shared or reduced access to household amenities) there was a shift according to secular trends in the cohort, in that measures like these became less prevalent in the whole cohort, as quality of life improved. However secular shifts were only seen in some of the measures used; parity was also reached on many other measures of disadvantage at mid-life (e.g. receipt of benefits and financial difficulties) which were still very prevalent indicators of disadvantage in the cohort. Furthermore, the achievement in parity of psychosocial and material circumstances by mid-life was mirrored by changes to social class over the life-course (see Appendix C, Table 1), again supporting a view that second generation Irish cohort members experienced a

degree of upward social mobility by mid-life and that the findings were not just a function of secular trends in the measures used to assess for disadvantage.

Timing and a 'sensitive' period

As discussed in Chapters 8 & 9, mediation analyses suggested consistent evidence implicating childhood adversity[322] in either fully or partially accounting for mid-life health inequalities in Irish people in this cohort. The 'timing' of adversity appeared to play a stronger role than the 'type' of adversity, for some mid-life health outcomes. This is a surprising finding, as one might expect that the specificity of some exposures might have a selective impact on some health outcomes but not others[147]. The finding that childhood may represent a 'sensitive' period which accounts for a range of later poor health outcomes, is a significant finding[147] and one which will be discussed further in the section entitled 'Policy implications'.

A potential exception to this was the finding in gender-stratified analyses, where childhood adversity appeared to only partially mediate smoking differences in Irish women compared to women in the rest of the sample, suggesting that there may have been other factors over the life-course which might have accounted for this outcome, but which could not be assessed in this analysis. This is in keeping with the broader literature, in which it has been suggested that although tobacco initiation and maintenance rates have fallen amongst populations in higher income countries, amongst particular sub-sections, (in particular women, ethnic minorities and people of lower socioeconomic position), trends supportive of a reduction in tobacco use have not been observed as consistently[341]. Experiences of childhood physical and sexual abuse, ongoing material disadvantage (e.g. low education, income and employment), gender-based violence, pregnancy and mental health[341, 342] are additional risk factors for tobacco use in women. More work is needed to explore the finding of persistent tobacco use over the life-course in second generation Irish women, as observed in my results; this finding may have been less to do with a 'sensitive period' in childhood and more to do with other distal risk factors.

The intergenerational 'transmission' of health inequalities in Irish people

One of the main themes to emerge across all three studies were the findings relating to potential aetiological 'mechanisms' which might account for the 'transmission' or transfer of health inequalities from first generation Irish-born migrants to the second generation. In the previous section I considered the role of 'timing' of exposures, and in particular, the notion of 'sensitive periods' of disadvantage which have been previously described in the life-course literature [33]. The following section will consider other aetiological mechanisms that may more specifically account for the 'intergenerational transmission' of health disadvantage in second generation Irish people in Britain.

Parental health and health-related behaviours

As the study of childhood suggested (Chapter 7), one mechanism that might account for psychological morbidity in second generation Irish children, was the poorer health of Irish-born parents. The literature review presented in Chapter 2 documented a large body of evidence on the health inequalities experienced by Irish-born migrants[19, 79], and so in this respect my findings relating to parental health were not unexpected. The novel aspect of this analysis was in showing that maternal depression mediated the association between ethnicity (second generation Irish status) and psychological morbidity. A second important finding in this analysis was that material hardship was an important mediator of the association of second generation Irish status and childhood psychological health in cohort members, *and* in the association with poorer mental and physical health of their parents.

In Chapters 8 and 9, I assessed the contribution of parental psychological health and parental health-related behaviours (recalled by cohort members at mid-life) in mediating the association between second generation Irish status and mid-life health outcomes. In this part of the analyses recalling that either parent had alcohol problems in childhood appeared to mediate the association of Irish ethnicity with mid-life CMD and partially mediated the association with mid-life binge alcohol use. Although recalling that a parent had psychological problems in childhood partially mediated the association between 2nd generation Irish status and mid-life CMD, this variable had little impact in other models.

Taken together, this would support the notion that parental health in childhood may play a part in accounting for health inequalities in the next generation, although the contribution of this was less consistent that that of childhood adversity.

Accumulation of adversity across multiple generations

Although I have already discussed at length 'accumulation' models of adversity in accounting for poorer downstream health within the *same* individuals over time[33], another possibility is that the accumulation of adversity leading to poorer health might occur across multiple generations[216]. For example, in an analysis by Osler and colleagues, the hazard ratio for mortality increased in a linear dose-response manner amongst Danish men born in 1953, for each parent or grandparent of a working class background[77] [216]. As I have discussed previously, studies of Irish-born migrants arriving in Britain during the time period of this cohort have suggested that these migrants were more likely to have been of poorer health[43, 74] and may have been more likely to have experienced adversity and disadvantage in their own childhoods[74]. Taken together with the evidence that risk factors for poorer adult health such as low birth weight may 'transmit' across generations despite improvements in intergenerational socioeconomic circumstances[330], it is possible that the mechanisms accounting for poorer health in second generation Irish cohort members spanned more than one generation, although it was not possible to assess this directly in this thesis.

Acculturation

In Chapter 2, I identified some research in which the role of acculturative processes in accounting for changes to health and health-related behaviours across generations of Irish descended people[55, 106], as well as in Irish born people exposed to British society[102] has been considered. On the whole, this literature supports the view that health-related behaviours in Irish-descended people have approximated to that of the

[77] ie. over three generations (Osler et al, 2005)

receiving country over time or generations, leading the authors of these studies to suggest that acculturation has taken place [55, 56, 102].

I found little evidence to support the view that health-related behaviours (of hazardous, harmful or binge alcohol use) in second generation Irish people had become similar to that of the receiving country, over time or over a generation. Although my findings support the view that smoking prevalence was similar in second generation Irish men relative to the rest of the sample at all time points, this was not seen for second generation Irish women, in whom smoking prevalence was elevated relative to women in the rest of the cohort, at mid-life. Behaviours such as abstinence (which have been considered a culturally based feature of patterns of alcohol use in Ireland[343]), remained more likely in second generation Irish women relative to the rest of the cohort at all of the time-points assessed. Like all of the other health outcomes assessed in this thesis, childhood adversity appeared to partially mediate the association between second generation Irish status and mid-life binge alcohol use or smoking. However, these health-related behaviours did not seem to mediate the association between second generation Irish status and common mental disorders and self-rated health at mid-life, suggesting that these behaviours did not in turn account for mid-life health inequalities [322]. This latter finding is consistent with one other study [55], although the findings in my study had the advantage of being based on an analysis of prospectively collected data. The limitation of a life course informed approach in addressing processes such as acculturation, are discussed further below.

Study limitations

In this section I will consider overall study limitations. These were previously discussed briefly in Chapters 7-9, but will be considered in more depth in this section.

Attrition

As with any prospective study, loss to follow up over time is always a concern. In Chapter 7, I analysed the childhood sweeps of the 1958 and 1970 British birth cohorts. Follow-up for NCDS was reasonable in childhood with overall response rates of 89%, 88%, 84% at age 7, 11, and 16[324]. In BCS70 the national teachers' strike reduced

follow-up at age 16, although response rates were still 78%, 86% and 66% at the ages of 5, 10 and 16 respectively[264]. I did not impute data for the childhood sweeps in the two cohorts given that the completeness of the data, despite some attrition, was adequate to perform complete case analyses without serious concerns over potential type 2 errors. A further concern may have been due to non-response bias, however there is no reason to believe that this was differential according to 2nd generation Irish status as the reasons for not being present across the three sweeps were reported as equivalent across the reference and Irish populations, in Chapter 7.

A number of further factors support my view that missing data mechanisms would not have adversely impacted on the study findings which I reported in Chapter 7. First, stark material, social and health disadvantages were shown in the two birth cohorts. This suggests that the study was adequately powered to detect differences, despite the loss of data across sweeps. Related to this, the findings from the un-imputed dataset from childhood sweeps of the NCDS were consistent in both size of effect and direction of effect, with the imputed data for these sweeps (presented in Chapters 8 and 9). This suggests that loss of data did not impact adversely on the ability to detect differences in health and social measures assessed in complete cases, in the childhood sweeps of NCDS. Finally, findings were consistent across two birth cohorts separated by more than a decade. This suggests consistency across time despite differing patterns of attrition in the two cohorts.

For the later sweeps of NCDS, attrition was more of a concern, such that response rates at the later sweeps of NCDS were 76%, 71%, 71% of the target sample at ages 23, 33, 42, respectively[310]. For the biomedical sweep, complete data on common mental disorders was available for 9297 cohort members (99% of biomedical sweep) and 9115 cohort members provided complete data on self-rated health (97% of biomedical sweep)[322]. 8671 individuals provided complete data on the AUDIT (92% of the biomedical sweep) and 9079 individuals provided complete data on smoking (97%) in the biomedical sweep. As discussed in Chapter 5, I conducted imputation of data to address the loss of data due to attrition in the later sweeps in NCDS. This method assumes that data is ‘missing at random’ (as defined and discussed in Chapter 6), and

helps to ‘get back’ lost data such that loss of power to detect differences due to attrition can be dealt with using this method.

Although multiple imputation deals with the loss of power from attrition, it is still a possibility that cohort members with poorer health[88], or living in more socially adverse circumstances[310], might have been less likely to respond to the various sweeps of data collection in the NCDS. There is no reason to believe that this would have varied according to Irish ethnicity. If people with poorer health outcomes had been more likely to have been lost to follow-up, and this was non-differential with respect to the main exposure (ethnicity) then this would have led to the estimates presented in this thesis to be biased towards the null, or an underestimation of the relative risks of disease outcomes. This would mean that the estimates of morbidity and adverse health-related behaviours in second generation Irish cohort members, relative to the rest of the sample, would be conservative.

Limitations of a historical cohort and the life course perspective

As this was a historical cohort it was not possible to assess exposures which may have been important to the experiences of Irish cohort members within the studies. I did not have information on the pre- and immediate post-migration histories of Irish-born parents. Information on parental pre-migration histories would have been helpful in directly assessing the ‘unhealthy migrant’/ ‘negative selection’ hypothesis[3, 74], as it would have provided a better understanding of why second generation Irish cohort members grew up in conditions of such stark social and material disadvantage.

As mentioned in Chapters 7-9, another data limitation related to not having information on experiences of discrimination within the cohorts. Cohort members lived in England during a period of escalating political conflict in Northern Ireland and are likely to have experienced a heightened anti-Irish feeling in British society. Second generation Irish people at times grapple with complex issues around identity and discrimination, experiencing discrimination both from non-Irish British people, as well as from sectors of their own community, as if to be second generation is less ‘authentic’ than being born in Ireland[14, 49]. I was unable to examine this issue directly. Relative to the rest of the

cohort Irish cohort members were at a much elevated risk of common mental disorders and binge drinking in 1981 when they were aged 23 (Chapters 8 and 9), this time point coincides with heightened Anglo-Irish tension. It would have been helpful to have an assessment of experiences of discrimination in order to examine this further, as there is a robust literature around the association of racism and discrimination with adverse mental health outcomes and health-related behaviours [344]. In particular it would have been informative to have an assessment of discrimination measured prospectively at multiple time-points, and this could have been assessed as a putative mediator in the association between 2nd generation Irish status and adverse health outcomes.

As discussed in the previous section, my findings suggested that although second generation Irish people were more likely to grow up under circumstances of marked material and social disadvantage, by mid-life, parity with the rest of the cohort on all indicators had been reached. Yet, despite high levels of upward social mobility, a number of health inequalities persisted. My analyses, largely performed through the lens of a life course informed perspective, appeared to indicate that childhood disadvantage accounted for most of the health inequalities at mid-life. However it is also possible that ongoing health disadvantages amongst Irish descended cohort members could have been due to other factors, which a life-course informed perspective is unable to address.

For example, in a parallel body of work, it has been shown that Irish people experience quite large 'protective' associations with health[78], when living in areas of higher own-group density [48, 115, 116]. These associations may be modified by individual-level experiences of racism, social support, chronic adversity and social networks[116]. Furthermore, there is evidence to suggest that ethnic minorities living in ethnically dense areas are less likely to report discrimination and to report more social support[116]. Neighbourhoods of higher Irish ethnic density confer a reduced risk of exposure to chronic stressors in Irish residents[48]. Group-level advantages for health

[78] Common mental disorders, psychotic experiences, suicidal ideation and limiting longstanding illness

may be related to the psychosocial advantages of feeling 'sheltered' or buffered by one's own community, especially if belonging to a marginalised group[116, 345]. Related to this, commentators have suggested that upward social mobility may lead to feelings of 'status inconsistency' whereby upwardly mobile individuals experience stress which may be deleterious to health when moving into a social class incongruent with their class of origin[345]; this may be exacerbated if such mobility patterns are associated with geographical relocation into neighbourhoods which although more affluent, may be away from one's own community[345].

A further factor which may have accounted for relative ongoing health differences amongst Irish cohort members despite apparent improvements in socioeconomic position, may have related to cultural factors which I was unable to directly assess in this study. For example, second generation Irish women were more likely to abstain from alcohol at all time-points in the study, with the interaction with gender being statistically significant at mid-life[346]. A body of literature has suggested strong temperance movements which have been and continue to be prominent in Ireland and in Northern Ireland and which cut across both Protestant and Catholic religions[347][79]. Historically, women have featured prominently in these movements. I was unable to directly assess this in the study, but one may infer that this trend in the data could support a culturally-influenced behaviour within the cohort which appeared to persist across time and generations, particularly in women and which (contrary to theory which suggests that culturally-specific behaviours of migrant or ethnic minority people should converge with that of the receiving-country population over time and generations) became even more pronounced, as the cohort aged. To my knowledge there has been very little prior life-course epidemiological work which has included models of acculturation across the life-course or over generations and this should be explored in future research including ethnic minority populations.

[79] For example see http://www.pioneerassociation.ie/

Assessment of outcomes using different measures across time

Throughout the thesis I have had to compare outcomes which have differed in measurement methods, between cohorts and over time. For example, in Chapter 7 the assessment of childhood emotional and behavioural disorders was based on the use of two different instruments[80] and in Chapter 8 I assessed common mental disorders over time using different instruments[81]. Similarly, in my assessment of alcohol use I was unable to assess patterns of neither 'binge' alcohol use over time, nor hazardous or harmful use at all time-points, as the same questions were not asked at each sweep. This may mean that findings relating to differences in some of these outcomes over time were not comparable. Other approaches such as structural equation modelling, which utilise latent variables[82], could be used to circumvent this challenge. This will be discussed in further detail below.

Use of 'country of birth' to determine ethnicity

I was unable to assess aspects of cultural identity using the data in this thesis. 'Country of birth' of parents was used to identify second generation Irish people. Therefore although I assessed 'structural' components of ethnic health disadvantage I was unable to assess identity-related components of ethnicity[47][83].

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[80] The Bristol Social Adjustment Guide and the Rutter Inventory

[81] At age 23 and 33 the Rutter Malaise Inventory was used, whereas at mid-life the Clinical Interview Schedule Revised (CIS-R) was used. Whereas the latter instrument has been described as assessing depression, the CIS-R assesses anxiety disorders and depression.

[82] A latent variable approach assumes that variables which are observed or 'manifest' represent an underlying latent trait which is not observed, but which can be measured using the manifest variables.

[83] A question asking cohort members to self-identify their ethnicity in the 2000 sweep of NCDS was asked, however this identified only 44 people reporting their ethnicity as 'Irish'. Therefore I did not use this variable for analyses as it would have led to a significant under-enumeration of second generation Irish people within the cohort.

Recent research has indicated that Irish people who report their ethnicity as 'Irish' and who were born in Republic of Ireland, Northern Ireland or Britain, were more likely to report their health as poor, or report longstanding limiting illness, relative to white British people[47]. This difference diminished after taking into account socioeconomic status in the case of respondents reporting their ethnicity as 'Irish' and born in Republic of Ireland[47]. The authors of this study suggest that reporting 'Irish' ethnicity taps into a self-identification with Irish culture and, possibly, experiences of anti-Irish racism[47]. Although I was unable to assess cultural/ identity aspects of the ethnicity variable, I was able to perform a detailed and original analysis of structural disadvantage over the life-course as experienced by second generation Irish people.

Consideration of the Irish traveller community

I have alluded to a large literature documenting stark health inequalities amongst the Irish traveller community in Ireland and other parts of Europe[348]. It was not possible to assess how far cohort members within this study would have come from a traveller background, however it is likely that this group would have been under-represented in the cohort as they typically represent a highly mobile population whose health needs can only be assessed adequately using studies specifically designed for this purpose [348]. As the literature consistently supports the view that the Irish Traveller community represent an especially marginalised group of people, it is likely that the health outcomes described for second generation Irish people in this study (assumed to mostly be of non-traveller origin) will be better than that which has been recorded for the Irish Traveller community[60, 348].

Limitation of analytic methods

Assessing contrasting models of risk over the life-course

In Chapter 3 I detailed the life-course epidemiological literature on 'accumulation', 'sensitive periods', 'critical periods' and 'social mobility' models of risk. As I mentioned in Chapter 3, many of these models overlap. For example, investigators assessing 'accumulation models' will assume that there is a dose-response association between the number of times an adversity is experienced and later health outcomes,

irrespective of the timing of the insult[33]. In contrast, investigators assessing 'critical' period or 'sensitive' period models will assume that the timing of the insult is crucial to later disease risk[33]. Finally a 'social mobility' model might apply to an instance where the effect of childhood adversity is mitigated (or is subject to effect modification, in statistical terms) by later upward social mobility[159]. If, as in the case of the present analysis, cohort members experienced adversity in childhood and then later were upwardly mobile, moving out of adversity by adulthood, in practice it would be difficult to distinguish these three competing models of risk, as it is impossible to produce '*exposure contrasts free of confounding'* [158], although attempts have been made to do this using specialist statistical methods[159].

Therefore , in this study, although the findings support a 'sensitive' period, in that childhood adversity appeared to mediate the association between 2nd generation Irish ethnicity and most of the adult health outcomes[84], the findings could also be consistent with 'accumulation' models of risk, although this was not directly assessed in the data[85]. In addition, the findings also suggested that upward social mobility was experienced by the majority of second generation Irish cohort members, relative to the rest of the sample. I have not directly assessed these competing models within this dataset however this could be considered in future research (see below).

Limitations of procedures to assess mediation in this study

In some of the models displayed in Chapter 8, contrary to expectation, the addition of putative mediators led to an **increase** in the size of the association between the main

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[84] And timing of exposure over 'type' of exposure appeared to play a larger role in mediating associations between second generation Irish ethnicity and later health outcomes such as common mental disorders and self-rated health.

[85] As discussed in Chapter 8, there was strong evidence in support of an accumulation model or of a dose-response relationship between exposure to manual social class and mid-life CMD and poorer self-rated health *in the full sample,* however there was no evidence of effect modification of this association by Irish ethnicity (see Appendix D; Table 2).

exposure (ethnicity) and the outcome variables. One interpretation is that these associations indicated 'suppression', in that adjustment of the putative mediator led to an increase in the size of association of the relationship between the exposure and outcome [349]. Although infrequent, examples of this exist in other contexts and have been defined as 'inconsistent mediation models' and likened to 'negative confounding' (in contrast to 'positive confounding' or 'consistent mediation models') [349]. In the case of my findings, the most marked suppression effects were seen when CMD or poorer self-rated health at earlier time points were adjusted in models assessing the relationship between ethnicity and (later) mid-life CMD and poorer self-rated health, respectively (Table 8-13 and Table 8-22). As with negative confounding[86], for a suppressor effect to be present one would expect the association between independent and dependent variable to be negative, so that it is 'cancelled out' by the addition of the mediator[349]. However this would not have been the case in these models, as when assessed all of the associations were positive[87]. In these instances, the findings could have been an artefact of the procedure used. An assumption which underlies assessment of mediation is that the residuals for the regression equation predicting: (1) the mediator from the independent variable and (2) the dependent variable from the independent variable with mediator added, are independent from each other[350]. This may not have been the case in these models. In these instances, approaches which might have handled 'common mental disorders' or 'poorer self-rated health' as latent variables (e.g. Structural Equation Modelling (SEM) approaches described in more detail below) may

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[86] The statistical methods underlying confounding, mediation and suppressor effects are the same, the differences lies in the interpretation or theoretical significance of models (MacKinnon *et al* (2000)).

[87] For example, in the case of common mental disorders (CMD), the association of Irish ethnicity (independent variable) and CMD at age 23,33 (mediator) was positive, as was the association of ethnicity and CMD at 44/45 (dependent variable) and the association of CMD at age 23/33 with CMD at 44/ 45 was also positive.

have given a more accurate assessment of these relationships and one could argue that 'suppression effects' here were spurious and an artefact of the analytic procedures used.

Finally, mediation approaches assume that there are no confounders in the association between dependent/ independent variables and mediators. Again, if there were any confounders for the associations listed in Table 8-13 and 8-22, this may have also led to inaccurate estimations of potential mediator effects.

Policy implications

Relevance to Irish people today

Despite the adoption of 'Irish' as an ethnic minority category in the 2001 census, research on the health needs of second generation Irish people remains scant. The findings from this study suggest that as this cohort ages, health problems may begin to become more evident in second generation Irish people, despite a picture suggesting increasing affluence compared to childhood. Further work is needed to understand the current prevalence of morbidity in second generation Irish people living in Britain. The findings in this thesis are consistent with a recent report from the Federation of Irish Societies which suggested that just under a third of second generation Irish people surveyed in London had experienced anxiety or depression, and that a third of second generation Irish people over the age of 65 reported being in poor health[49], suggesting that these findings are not just an artefact of the cohort or time period but still relevant to contemporary second generation Irish adults and older adults.

Findings relating to tobacco use suggested that this may still be an issue in second generation Irish women relative to women in the rest of the population. If this is the case, interventions targeting this behaviour are needed specifically for this group to avoid associated health problems. Policies aimed at reducing tobacco use have failed to reach some sections of the ethnic minority communities living in Britain[331], and this may also apply to second generation Irish women.

Relevance to other ethnic minority groups

Childhood poverty remains a common feature of migration and settlement for many migrant families in Britain today, partly attributable to government policy which aims to restrict access to employment and benefits, particularly for illegal migrants and asylum seekers and refugees[259]. Parallels may be drawn between Irish migration to Britain in the late 1950s and 1960s and migration from some of the recent accession (A8) states in Eastern Europe [351, 352][88]. Migration from these regions constitutes a growing body of 'new' migrants, mostly described (like the Irish previously) as 'white other'. Governments anticipated that people from the A8 states would return to their country of origin after relatively short stays; while this was seen for initial waves of migrants from the accession states, more recent migratory flows have been characterised by workers accompanied by families[353]. An initial wish to return on the part of the migrant may transform into longer term settlement, usually with families[351, 353]. It has been suggested that people who migrate with a view to temporary residence are less likely to invest in their children's education in the host country - this may have a long-term detrimental impact on their children's life-chances if settlement then becomes permanent[353, 354].

My study makes a novel contribution to the literature as it was possible to use prospective data to analyse the linkages between childhood poverty and later down-stream health disparities in second generation Irish people, a group who I characterised previously as occupying a position of relative social disadvantage in the post-war boom

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[88] In fact the similarities are stark. A recent review on Polish migration to Britain suggested that harsh economic circumstances in Poland have meant that economic out-migration has been perceived as rational and culturally normative decision. Polish migrants in Britain have been reported as experiencing harsh employment and housing conditions (albeit with some improvements since 2004 when Poland joined the EU), and high levels of under-employment or downward social mobility. The population has been characterised as young and frequently accompanied by family, whereby part of the decision to move was influenced by a desire to improve opportunities for the next generation (Burrell, 2010).

years in Britain, but who were in general, able to move out of this by mid-life. The relatively youthful nature of ethnic minority groups now settling in Britain means that it may be a few more decades before similar studies examining the life-course from birth through to middle and late adulthood can be conducted in other migrant or ethnic minority groups.

Recommendations for future research

The findings from this thesis suggest a number of important priorities for future research:

1. This study has filled a gap with respect to aetiological research examining mechanisms for the 'transfer' of health inequalities from first generation to second generation Irish people. The literature review in this thesis highlighted a paucity of work examining the health of second generation minority ethnic groups in general. Therefore the aetiological mechanisms suggested in this thesis could be assessed in other datasets or minority ethnic populations, which may help to inform public health policy on migration and settlement.
2. 'Snap-shot' measures of socioeconomic position, taken from cross-sectional data in ethnic minority and migrant groups may mask important differences in socioeconomic position over the life-course. Future research should assess, where possible, prospective associations between health and disadvantage indicators in ethnic minority and migrant groups. In particular the findings suggest the importance of the settlement experiences of Irish-born parents, which resulted in second generation Irish children growing up in relative adversity compared with the rest of the cohorts. These experiences had very specific associations both with child and adult health of second generation Irish cohort members. This should be considered in future research of second generation Irish people, as well as other second generation ethnic minority groups.
3. A limitation of the present study was the inability to assess directly the impact of discrimination or acculturation longitudinally in the cohort. This should be

considered in future research into first and second generation ethnic minority health.

4. This thesis presented findings relating to mid-life health outcomes in second generation Irish cohort members. As the cohort ages, the possibility of assessing these associations at later time-points is of interest, in particular to assess if childhood continues to exert a strong influence on health outcomes further downstream (for example in old age) in second generation Irish people.
5. Future work could assess the contribution of life-course models (e.g.' social mobility', 'accumulation' and 'sensitive period' models) in accounting for poorer health within this dataset, using advanced statistical methods [159, 355]. As I described in the previous section, this is challenging as the models are not mutually exclusive of each other. However, one approach which could be taken in future work, might be to use Structural Equation Modelling (SEM[89])-based approaches [355]. These approaches not only deal with issues relating to temporal correlation, but can also deal with other problems of causal inference, such as measurement error and missing data [355][90].
6. SEM-based approaches might also be used in future work to extend the mediation analyses presented in this study. The approach taken in this study was to compare coefficients for associations between main exposures and outcomes after taking into account potential mediators. This approach used standard

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[89] Structural Equation Models are composed of a 'structural' and a 'measurement' part in the model. In the 'measurement' part, manifest or observed variables are used as proxy variables to assess the underlying unobserved or latent variable. In the 'structural' part, the associations of the latent variable with the outcome is estimated (355.De Stavola, B.L., et al., *Statistical Issues in Life Course Epidemiology.* American Journal of Epidemiology, 2006. **163**(1): p. 84-96.)

[90] As an alternative to SEM-based approaches, another approach might be to adopt the techniques used by Mishra and colleagues (159.Mishra, G., et al., *A structured approach to modelling the effects of binary exposure variables over the life course.* International Journal of Epidemiology, 2009. **38**(2): p. 528-537.) In this approach, 'social mobility' was conceptualised as a sensitive period modified (ie. statistical interaction) by later experiences over the life-course. The three trajectories (of sensitive period versus accumulation versus social mobility) are parameterized as regression equations,, or, "*as an alternative nested specification of a more general (saturated) model*" (159) Likelihood Ratio Tests can then be used to compare nested models. This approach could be used in future analyses of this data (159).

logistic regression modelling. As most mediators and all adult health outcomes were binary, it was not possible to obtain an assessment of 'direct' or 'indirect' effects in mediation analyses[91]. SEM-based approaches are superior as they can provide an assessment of 'direct', 'indirect' and 'total' effects, even in instances where mediator and/ or the outcome are dichotomous. SEMs can also be used in path analysis, whereby mediators are treated as exposures within the same sets of analyses[217], or where there are multiple mediators or outcomes

Final conclusions

In this study I explored mechanisms over the life-course that might have accounted for poorer health at mid-life in second generation Irish people living in Britain. The main findings suggested that social and material disadvantage experienced by Irish cohort members in childhood impacted adversely not only on psychological health in childhood, but continued to have long-range effects on health much later into adulthood, despite Irish cohort members having moved out of relative disadvantage by mid-life. These findings challenge the notion that the health inequalities previously described in second generation Irish people are due to 'cultural' or 'ethnic' differences, and instead support a more dynamic model that links experiences of social and material adversity over the life-course (and specifically, in childhood) to health outcomes. The findings from this thesis contribute to our knowledge on Irish health disparities as well as to potential mechanisms for the 'intergenerational transfer' of health inequalities from first generation migrants to second generation ethnic minorities.

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[91] In mediation analysis the 'total effect'='direct effect' + 'indirect effect'. The addition of the putative mediator will lead to a reduction in "*the effect of the causal variable on the outcome or ab=c-c'. The indirect effect or ab is the measure of the amount of mediation*"

(from http://davidakenny.net/cm/mediate.htm#IE; accessed June 2013).

Bibliography

1. Davey-Smith, G., et al., *Ethnic inequalities in health: a review of UK epidemiological evidence.* Critical Public Health, 2000. **10**(4): p. 375 - 408.

2. Bhopal, R., *Is research into ethnicity and health racist, unsound, or important science?* BMJ 1997. **314**(7096): p. 1751.

3. Marmot, M.G., A.M. Adelstein, and L. Bulusu, *Lessons from the study of immigrant mortality* The Lancet 1984. **323**(8392): p. 1455-1457.

4. Odegaard, O., *Emigration and insanity.* Acta Psychiatrica et Neurologica, 1932(Suppl 4): p. 1-206.

5. Sproston, J. and J. Nazroo, *Ethnic Minority Psychiatric Illness Rates in the Community (EMPIRIC): Quantitative Report.* 2002, The Stationery Office: London

6. Becker, E., et al., *Health Survey for England: 2004. The health of minority ethnic groups,* in *Health Survey for England*, K. Sproston and J. Mindell, Editors. 2006, The information centre: Leeds.

7. Hickman, M.J., S. Morgan, and B. Walter, *Second-generation Irish People in Britain: a demographic, socio-economic and health profile: A research report for the DION committee* 2001, Irish Studies Centre, University of North London. : London.

8. Fitzpatrick, M. and J. Newton, *Profiling mental health needs: what about your Irish patients?* British Journal of General Practice, 2005. **55**: p. 739-740.

9. Harding, S. and R. Balarajan, *Patterns of mortality in second generation Irish living in England and Wales: longitudinal study.* BMJ 1996. **312**(7043): p. 1389-1392.

10. Harding, S. and R. Balarajan, *Mortality of third generation Irish people living in England and Wales: longitudinal study.* BMJ, 2001. **322**(7284): p. 466-467.

11. Abbotts, J., R. Williams, and G.D. Smith, *Association of medical, physiological, behavioural and socio-economic factors with elevated mortality in men of Irish heritage in West Scotland.* J Public Health, 1999. **21**(1): p. 46-54.

12. Fielder, H.M.P., J.G. Avery, and D. Wright, *Effects of social deprivation in whole population should be addressed.* BMJ, 1996. **313**(7059): p. 753.

13. Kelleher, D. and S. Hillier, *The health of the Irish in England,* in *Researching Cultural Differences in Health*, D. Kelleher and S. Hillier., Editors. 1996, Routledge: London. p. 103-123.

14. Hickman, M.J., et al., *The limitations of whiteness and the boundaries of Englishness: Second-generation Irish identifications and positionings in multiethnic Britain.* Ethnicities, 2005. **5**(2): p. 160-182.

15. Robinson, V. and R. Valley, *Ethnic minorities, employment, self-employment, and social mobility in post-war Britain*, in *Ethnicity, social mobility and public policy*, G.C. Loury, T. Modood, and S.M. Teles, Editors. 2005, Cambridge University Press: Canbridge. p. 414-448.

16. Winston, N., *Between two places- emigrant integration and identity: A case study of Irish-born people living in England*. 2000, Dublin: European Cultural Foundation.

17. Abbotts, J., R. Williams, and G. Davey-Smith, *Mortality in men of Irish heritage in West Scotland.* Public Health, 1998. **112**(4): p. 229-232.

18. Raftery, J., D.R. Jones, and M. Rosato, *The mortality of first and second generation Irish immigrants in the U.K.* Social Science & Medicine, 1990. **31**(5): p. 577-584.

19. Wild, S. and P. Mckeigue, *Cross sectional analysis of mortality by country of birth in england and wales, 1970-92.* BMJ, 1997. **314**(7082): p. 705.

20. Burke, A., *Attempted suicide among the Irish-born population in birmingham.* The British Journal of Psychiatry, 1976. **128**(6): p. 534-537.

21. Merrill, J. and J. Owens, *Self poisoning among four immigrant groups. .* Acta Psychiatrica Scandinavica, 1988. **77**(1): p. 77-80.

22. Maynard, M.J., et al., *Trends in suicide among migrants in England and Wales 1979-2003.* Ethnicity & Health, 2012. **17**(1-2): p. 135-140.

23. Clucas, M., *Researching Irish Health Inequalities in England: A Case Study of First and Second Generation Irish Men and Women in Coventry*. 2009, Department of Sociology; University of Warwick. PhD thesis: Warwick.

24. Hjern, A. and P. Allebeck, *Suicide in first- and second-generation immigrants in Sweden A comparative study.* Social Psychiatry and Psychiatric Epidemiology, 2002. **37**(9): p. 423-429.

25. Hjern, A. and P. Allebeck, *Alcohol-related disorders in first- and second-generation immigrants in Sweden: a national cohort study.* Addiction, 2004. **99**(2): p. 229-236.

26. Hjern, A., S. Wicks, and C. Dalman, *Social adversity contributes to high morbidity in psychoses in immigrants â€“ a national cohort study in two generations of Swedish residents.* Psychological Medicine, 2004. **34**(06): p. 1025-1033.

27. Ferrada-Noli, M., *A cross-cultural breakdown of Swedish suicide.* Acta Psychiatrica Scandinavica, 1997. **96**(2): p. 108-116.

28. Saraiva Leao, T., et al., *Incidence of Mental Disorders in Second-Generation Immigrants in Sweden: A Four-Year Cohort Study.* Ethnicity & Health, 2005. **10**(3): p. 243-256.

29. Mortensen, P.B., E. Cantor-Graae, and T.F. McNeil, *Increased rates of schizophrenia among immigrants: some methodological concerns raised by Danish findings.* Psychological Medicine, 1997. **27**(04): p. 813-820.

30. Elford, J. and Y. Ben-Shlomo, *Geography and migration with special reference to cardiovascular disease*, in *A life course approach to chronic disease epidemiology*, D. Kuh and Y. ben-Shlomo, Editors. 2004, Oxford University Press: Oxford p. 6.

31. Abbotts, J., et al., *Morbidity and Irish Catholic descent in Britain: An ethnic and religious minority 150 years on.* Social Science & Medicine, 1997. **45**(1): p. 3-14.

32. Castles, S. and M.J. Miller, *The age of migration: International population movements in the modern world*. 4th ed. 2009: Palgrave MacMillan.

33. Ben-Shlomo, Y. and D. Kuh, *A life course approach to chronic disease epidemiology: conceptual models, empirical challenges and interdisciplinary perspectives.* Int J Epidemiol, 2002. **31**: p. 285 - 293.

34. Galobardes, B., J.W. Lynch, and G. Davey-Smith, *Is the association between childhood socioeconomic circumstances and cause-specific mortality established? Update of a systematic review.* Journal of Epidemiology & Community Health 2008. **62**(5): p. 387-390.

35. Poulton, R., et al., *Association between children's experience of socioeconomic disadvantage and adult health: a life-course study.* The Lancet, 2002. **360**(9346): p. 1640-1645.

36. Das-Munshi, J., et al., *Migration, social mobility and common mental disorders: critical review of the literature and meta-analysis.* Ethnicity & Health 2012. **17**(1-2): p. 17-53.

37. Haskey, J., *Mortality among second generation Irish in England and Wales.* BMJ, 1996. **312**(7043): p. 1373-1374.

38. Hickman, M., *Ruling and empire, governing a multinational state: the impact of Britain's historical legacy on the ethno-racial regime*, in *Ethnicity, social mobility and public policy: Comparing the US & UK*, G.C. Loury, T. Modood, and S.M. Teles, Editors. 2005, Cambridge University Press: Cambridge. p. 21-49.

39. Ryan, B., *The Common Travel Area between Britain and Ireland.* The Modern Law Review, 2001. **64**(6): p. 831-854.

40. Bebbington, P.E., J. Hurry, and C. Tennant, *Psychiatric disorders in selected immigrant groups in Camberwell.* Social Psychiatry and Psychiatric Epidemiology, 1981. **16**(1): p. 43-51.

41. Abbotts, J., et al., *Morbidity and Irish Catholic descent in Britain: relating health disadvantage to behaviour* Ethnicity and Health 1999. **4**(4): p. 221-230.

42. Williams, R. and R. Ecob, *Regional Mortality and the Irish in Britain: Findings from the ONS Longitudinal Study.* Sociology of Health & Illness, 1999. **21**(3): p. 344-367.

43. Leavey, G., S. Sembhi, and G. Livingston, *Older Irish migrants living in London: identity, loss and return.* Journal of Ethnic and Migration Studies, 2004. **30**(4): p. 763 - 779.

44. Leavey, G., *Suicide and Irish migrants in Britain: Identity & integration. .* International Review of Psychiatry 1999(11): p. 168-172.

45. Leavey, G., et al., *Explanations of depression among Irish migrants in Britain.* Social Science & Medicine 2007. **65**(2): p. 231-244.

46. Ryan, L., *Family Matters: (e)migration, familial networks and Irish women in Britain.* The Sociological Review, 2004. **52**(3): p. 351-370.

47. Clucas, M., *The Irish health disadvantage in England: contribution of structure and identity components of Irish ethnicity.* Ethnicity & Health 2009. **14**(6): p. 553 - 573.

48. Das-Munshi, J., et al., *Ethnic density as a buffer for psychotic experiences: findings from a national survey (EMPIRIC).* The British Journal of Psychiatry, 2012. **201**(4): p. 282-290.

49. Moore, J., et al., *Fresh Perspectives: A Needs Analysis of the Irish Community in London*. 2012, London Irish Centre: London.

50. Department of Health and Social Security, *Inequalities in health: Report of a research working group*. 1980, DHSS: London.

51. Power, C., S. Matthews, and O. Manor, *Inequalities in self-rated health: explanations from different stages of life.* The Lancet, 1998. **351**(9108): p. 1009-1013.

52. Hornsby-Smith, M.P. and A. Dale, *The Assimilation of Irish Immigrants in England.* The British Journal of Sociology, 1988. **39**(4): p. 519-544.

53. Platt, L., *Migration and social mobility: The life chances of Britain's ethnic minority communities*. 2005. The Policy Press, Joseph Rowntree Foundation Bristol.

54. Heath, A. and D. MacMahon, *Social mobility of ethnic minorities*, in *Ethnicity, social mobility and public policy*, G.C. Loury, T. Modood, and S.M. Teles, Editors. 2005, Cambridge University Press: Cambridge. p. 393-413.

55. Smith, N.R., Y.J. Kelly, and J.Y. Nazroo, *Intergenerational continuities of ethnic inequalities in general health in England.* Journal of Epidemiology & Community Health 2009. **63**(3): p. 253-258.

56. Smith, N.R., Y.J. Kelly, and J.Y. Nazroo, *The effects of acculturation on obesity rates in ethnic minorities in England: evidence from the Health Survey for England.* The European Journal of Public Health, 2012. **22**(4): p. 508-513.

57. Harding, S., *The incidence of cancers among second-generation Irish living in England and Wales.* Br J Cancer, 1998. **78**(7): p. 958-961.

58. Cochrane, R. and S.S. Bal, *Mental hospital admission rates of immigrants to England: A comparison of 1971 and 1981.* Social Psychiatry and Psychiatric Epidemiology, 1989. **24**(1): p. 2-11.

59. Commander, M.J., et al., *Psychiatric morbidity in people born in Ireland.* Social Psychiatry and Psychiatric Epidemiology, 1999. **34**(11): p. 565-569.

60. Parry, G., et al., *Health status of Gypsies and Travellers in England.* Journal of Epidemiology and Community Health, 2007. **61**(3): p. 198-204.

61. Adelstein, M., et al., *Comparison of mortality in Irish immigrants in England & Wales with that of Irish and British nationals.* Irish Medical Journal 1986. **79**: p. 185-189.

62. Cochrane, R., *Mental illness in immigrants to England and Wales: An analysis of mental hospital admissions, 1971.* Social Psychiatry and Psychiatric Epidemiology, 1977. **12**(1): p. 25-35.

63. Razum, O., H. Zeeb, and S. Rohrmann, *The healthy migrant effect'-not merely a fallacy of inaccurate denominator figures.* Int. J. Epidemiol., 2000. **29**(1): p. 191-192.

64. Wild, S.H., et al., *Mortality from all causes and circulatory disease by country of birth in England and Wales 2001-2001.* J Pub Health 2007. **29**: p. 191.

65. Wild, S.H., et al., *Mortality from all cancers and lung, colorectal, breast and prostate cancer by country of birth in England and Wales, 2001-2003.* Br J Cancer, 2006. **94**(7): p. 1079-1085.

66. Kelleher, C.C., et al., *Hurling Alone? How Social Capital Failed to Save the Irish From Cardiovascular Disease in the United States.* Am J Public Health, 2004. **94**(12): p. 2162-2169.

67. Maxwell, R. and S. Harding, *Mortality of migrants from outside England and Wales by marital status*, in *Population Trends*. 1998, Office for National Statistics. p. 15-22.

68. Harrison, L., M. Sutton, and E. Gardiner, *Ethnic Differences in Substance Use and Alcohol-Use-Related Mortality among First Generation Migrants to England and Wales.* Substance Use & Misuse, 1997. **32**(7-8): p. 849-876.

69. Rosenwaike, I. and K. Hempstead, *Differential mortality by ethnicity: Foreign-born Irish, Italians and Jews in New York city, 1979-81.* Social Science & Medicine, 1989. **29**(7): p. 885-889.

70. Dean, G., A. Adelstein, and J. Spooner, *Suicide and Self-Poisoning in Great Britain and Ireland.* International Journal of Epidemiology, 1976. **5**(2): p. 145-151.

71. Burvill, P.W., B.K. Armstrong, and D.J. Carlson, *Attempted suicide and immigration in Perth, Western Australia, 1969–1978.* Acta Psychiatrica Scandinavica, 1983. **68**(2): p. 89-99.

72. Burvill, P.W., et al., *Comparison of suicide rates and methods in English, Scots and Irish migrants in Australia.* Social Science & Medicine, 1983. **17**(11): p. 705-708.

73. DeSalvo, K.B., et al., *Mortality Prediction with a Single General Self-Rated Health Question.* Journal of General Internal Medicine, 2006. **21**(3): p. 267-275.

74. Delaney, L., A. Fernihough, and J.P. Smith, *Working paper: Exporting poor health; The Irish in England*, in *RAND Labor and Population working paper series*. 2011, University College Dublin, Geary Institute and School of Economics, RAND Corporation.

75. Kuh, D. and M. Wadsworth, *Parental Height: Childhood Environment and Subsequent Adult Height in a National Birth Cohort.* International Journal of Epidemiology, 1989. **18**(3): p. 663-668.

76. Razum, O., *Commentary: Of salmon and time travellersâ€"musing on the mystery of migrant mortality.* International Journal of Epidemiology, 2006. **35**(4): p. 919-921.

77. Crawford, M.J., et al., *Suicidal ideation and suicide attempts among ethnic minority groups in England: results of a national household survey.* . Psychological Medicine, 2006. **35**: p. 1369-1377.

78. Weich, S., et al., *Common mental disorders and ethnicity in England: the EMPIRIC study.* Psychological Medicine, 2004. **34**: p. 1543-1551

79. Ryan, L., et al., *Depression in Irish migrants living in London: case-control study.* The British Journal of Psychiatry 2006. **188**(6): p. 560-566.

80. Clare, A.W., *Alcoholism and Schizophrenia in Irishmen in London—a Reassessment.* British Journal of Addiction to Alcohol & Other Drugs, 1974. **69**(3): p. 207-212.

81. Lewis, G., et al., *Measuring psychiatric disorder in the community: a standardized assessment for use by lay interviewers.* Psychological Medicine 1992. **22**: p. 465 -86.

82. Harris, E.C. and B. Barraclough, *Suicide as an outcome for mental disorders. A meta-analysis.* The British Journal of Psychiatry, 1997. **170**(3): p. 205-28.

83. Das-Munshi, J., et al., *Public health significance of mixed anxiety and depression: beyond current classification.* The British Journal of Psychiatry, 2008. **192**(3): p. 171-177.

84. DePonte, P., *Deaths from suicide and undetermined injury in London*. 2005. p. 23-36.

85. Neeleman, J. and S. Wessely, *Ethnic minority suicide: a small area geographical study in south London.* Psychological Medicine, 1999. **29**(02): p. 429-436.

86. Neeleman, J., V. Mak, and S. Wessely, *Suicide by age, ethnic group, coroners' verdicts and country of birth. A three-year survey in inner London.* The British Journal of Psychiatry, 1997. **171**(5): p. 463-467.

87. Stillwell, G., A. Boys, and J. Marsden, *Alcohol use by young people from different ethnic groups: consumption, intoxication and negative consequences.* Ethnicity & Health, 2004. **9**(2): p. 171 - 187.

88. Clark, C., et al., *Childhood and Adulthood Psychological Ill Health as Predictors of Midlife Affective and Anxiety Disorders: The 1958 British Birth Cohort.* Arch Gen Psychiatry 2007. **64**(6): p. 668-678.

89. Fuller, E., *Children's health.* The health of minority ethnic groups, 2006. **1**.

90. Abbotts, J.E., et al., *Poor but healthy? The youngest generation of Irish Catholics in West Scotland.* Health Bulletin, 2001. **59**(6): p. 373-380.

91. Nazroo, J., et al., *Children's Health*, in *Health Survey for England: the Health of Minority Ethnic Groups, '99*, Bob Erens, Paola Primatesta, and G. Prior, Editors. 1999, Department of Health: London.

92. Skrabanek, P., *The Irish in England- do they behave?* . Irish Medical Journal 1986. **79**(11): p. 331.

93. Walls, P., *Irish mental health in England: the evidence. Appendix 1 and 2* in *Consulting the Irish community on inside Outside: Improving mental health services for*

Black and Ethnic Minority Communities in England - the community response and its evaluation. 2004, Report commissioned by the Federation of Irish Societies and funded by the Department of Health.

94. Senior, P.A. and R. Bhopal, *Ethnicity as a variable in epidemiological research.* BMJ, 1994. **309**(6950): p. 327-330.

95. Tilki, M., *The social contexts of drinking among Irish men in London.* Drugs: education, prevention and policy, 2006. **13**(3): p. 247 - 261.

96. Foster, J.H., *The Irish alcohol misuser in England: Ill served by research and policy? Some suggestions for future research opportunities* Drugs, education, prevention and policy 2003. **10**(1): p. 57-63.

97. Dean, G., H. Downing, and E. Shelley, *First admissions to psychiatric hospitals in south-east England in 1976 among immigrants from Ireland.* British Medical Journal (Clinical research ed.), 1981. **282**(6279): p. 1831-1833.

98. Ramstedt, M. and A. Hope, *The Irish drinking habits of 2002- Drinking and drinking-related harm in a European comparative persepctive.* Journal of Substance Use, 2005. **10**(5): p. 273-283.

99. Bhala, N., C. Fischbacher, and R. Bhopal, *Mortality for Alcohol-related Harm by Country of Birth in Scotland, 20001-2004: Potential Lessons for Prevention.* Alcohol and Alcoholism. **45**(6): p. 552-556.

100. Bhala, N., et al., *Alcohol-related and hepatocellular cancer deaths by country of birth in England and Wales: analysis of mortality and census data.* Journal of Public Health, 2009. **31**(2): p. 250-257.

101. Rao, R., K. Wolff, and E.J. Marshall, *Alcohol use and misuse in older people: a local prevalence study comparing English and Irish inner-city residents living in the UK.* Journal of Substance Use, 2008. **13**(1): p. 17 - 26.

102. McCambridge, J., et al., *Patterns of alcohol consumption and problems among the Irish in London: A preliminary comparison of pub drinkers in London and Dublin.* Addiction Research and Theory, 2004. **12**: p. 373-384.

103. Erens, B. and J. Laiho, *Chapter 5: Alcohol Consumption*, in *The Health Survey for England: The health of minority ethnic groups, 1999*, B. Erens, P. Primatesta, and G. Prior, Editors. 2001, The Stationery Office: London.

104. Canning, U.P., et al., *Substance misuse in acute general medical admissions.* QJM, 1999. **92**(6): p. 319-326.

105. Foster, J.H., E.J. Marshall, and T.J. Peters, *Predictors of relapse to heavy drinking in alcohol dependent subjects following alcohol detoxification—the role of*

quality of life measures, ethnicity, social class, cigarette and drug use. Addiction Biology, 1998. **3**(3): p. 333-343.

106. Mullen, K., R. Williams, and K. Hunt, *Irish descent, religion, and alcohol and tobacco use.* Addiction, 1996. **91**(2): p. 243-254.

107. Greenslade, L., M. Pearson, and M. Madden, *A good man's fault: Alcohol and Irish people at home and abroad* Alcohol & Alcoholism 1995. **30**(4): p. 407-417.

108. Taylor, C., et al., *Prospective study of alcohol-related admissions in an inner-city hospital.* The Lancet, 1986. **328**(8501): p. 265-268.

109. Balarajan, R. and P. Yuen, *British smoking and drinking habits: variations by country of birth.* Journal of Public Health, 1986. **8**(3): p. 237-239.

110. Muhlin, G., *Ethnic differences in alchohol misuse: A striking reaffirmation.* Journal of Studies on Alcohol 1985. **46**(2): p. 172-173.

111. Bagley, C. and A.Y.O. Binitie, *Alcoholism and Schizophrenia in Irishmen in London.* British Journal of Addiction to Alcohol & Other Drugs, 1970. **65**(1): p. 3-7.

112. Nazroo, J.Y. and D.R. Williams, *The social determination of ethnic/ racial inequalities in health*, in *Social Determinants of Health*, M. Marmot and R.G. Wilkinson, Editors. 2006, Oxford University Press: Oxford. p. 238.

113. Karlsen, S., et al., *Racism, psychosis and common mental disorder among ethnic minority groups in England.* Psychological Medicine, 2005. **35**: p. 1795-1803.

114. Bhui, K., et al., *Racial/Ethnic Discrimination and Common Mental Disorders Among Workers: Findings From the EMPIRIC Study of Ethnic Minority Groups in the United Kingdom.* Am J Public Health, 2005. **95**(3): p. 496-501.

115. Becares, L. and J. Das-Munshi, *Ethnic density, health care seeking behaviour and expected discrimination from health services among ethnic minority people in England.* Health & Place, 2013. **22**(0): p. 48-55.

116. Das-Munshi, J., et al., *Understanding the effect of ethnic density on mental health: multi-level investigation of survey data from England.* BMJ 2010. **341**: p. c5367.

117. Shaw, R.J., et al., *Impact of ethnic density on adult mental disorders: narrative review.* The British Journal of Psychiatry. **201**(1): p. 11-19.

118. Urquia, M.L. and A.J. Gagnon, *Glossary: Migration and health.* Journal of Epidemiology and Community Health, 2011. **65**(5): p. 467-472.

119. Hawkins, S.S., et al., *Influence of moving to the UK on maternal health behaviours: prospective cohort study.* BMJ, 2008. **336**(7652): p. 1052-1055.

120. Clark, C., et al., *Does the influence of childhood adversity on psychopathology persist across the lifecourse? A 45 year prospective epidemiologic study.* Annals of Epidemiology, 2010. **20**(5): p. 385-394.

121. Kuh, D., et al., *Social pathways between childhood and adult health.* A life course approach to chronic disease epidemiology, 1997: p. 169 - 198.

122. Wadsworth, M. and D. Kuh, *Childhood influences on adult health: a review of recent work from the British 1946 national birth cohort study, the MRC National Survey of Health and Development.* Paediatr Perinat Epidemiol, 1997. **11**: p. 2 - 20.

123. Abbotts, J., *Irish Catholic Health Disadvantage in the west of Scotland.* Scottish Affairs, 2004(46).

124. Abbotts, J., S. Harding, and K. Cruickshank, *Cardiovascular risk profiles in UK-born Caribbeans and Irish living in England and Wales.* Atherosclerosis, 2004. **175**(2): p. 295-303.

125. Weitoft, G.R., et al., *Mortality statistics in immigrant research: method for adjusting underestimation of mortality.* International Journal of Epidemiology, 1999. **28**(4): p. 756-763.

126. Rafnsson, S.B., et al., *Sizable variations in circulatory disease mortality by region and country of birth in six European countries.* The European Journal of Public Health.

127. Marmot, M.G. and S.L. Syme, *Acculturation and coronary heart disease in Japanese-Americans.* American Journal of Epidemiology, 1976. **104**(3): p. 225-247.

128. Chaturvedi, N., *Ethnicity as an epidemiological determinantâ€"crudely racist or crucially important?* International Journal of Epidemiology, 2001. **30**(5): p. 925-927.

129. Kuh, D. and G. Davey-Smith, *The life course and adult chronic disease: an historical perspective with particular reference to coronary heart disease*, in *A life course approach to chronic disease epidemiology*, D. Kuh and Y. Ben-Shlomo, Editors. 1997, Oxford University Press: Oxford. p. 15 - 41.

130. Davey-Smith, G. and J. Lynch, *Life course approaches to socioeconomic differentials to health*, in *A life course approach to chronic disease epidemiology*, D. Kuh and Y. Ben-Shlomo, Editors. 2004, Oxford University Press: Oxford. p. 77-115.

131. Wadsworth, M., E. Ferri, and J. Bynner, *Changing Britain*, in *Changing Britain, changing lives: Three generations at the turn of the century*, E. Ferri, J. Bynner, and M. Wadsworth, Editors. 2003, Institute of Education: London. p. 1-28.

132. Kuh, D., et al., *Life course epidemiology.* Journal of Epidemiology and Community Health, 2003. **57**(10): p. 778-783.

133. Lawlor, D.A., Y. Ben-Shlomo, and D.A. Leon, *Pre-adult influences in cardiovascular disease*, in *A life course approach to chronic disease epidemiology*, D. Kuh and Y. Ben-Shlomo, Editors, Oxford University Press: Oxford p. 41-76.

134. Forsdahl, A., *Are poor living conditions in childhood and adolescence an important risk factor for arteriosclerotic heart disease?* . British Journal of Preventive and Social Medicine, 1977. **31**: p. 91-95.

135. Barker, D.J.P. and C. Osmond, *Infant mortality, childhood nutrition and ischaemic heart disease in England and Wales.* The Lancet, 1986. **327**(8489): p. 1077-1081.

136. Ben-Shlomo, Y. and G.D. Smith, *Deprivation in infancy or in adult life: which is more important for mortality risk?* The Lancet, 1991. **337**(8740): p. 530-534.

137. Elford, J., A.G. Shaper, and P. Whincup, *Early life experience and cardiovascular disease--ecological studies.* Journal of Epidemiology and Community Health, 1992. **46**(1): p. 1-8.

138. Barker, D.J.P., et al., *Weight in infancy and death from ischaemic heart disease.* The Lancet, 1989. **334**(8663): p. 577-580.

139. Barker, D.J., et al., *Fetal and placental size and risk of hypertension in adult life.* BMJ, 1990. **301**(6746): p. 259-262.

140. Barker, D.J.P., *Fetal origins of coronary heart disease.* BMJ, 1995. **311**(6998): p. 171-174.

141. Strachan, D.P., et al., *Lifecourse influences on health among British adults: Effects of region of residence in childhood and adulthood.* International Journal of Epidemiology, 2007. **36**(3): p. 522-531.

142. Kinra, S., et al., *Association Between Urban Life-Years and Cardiometabolic Risk.* American Journal of Epidemiology. **174**(2): p. 154-164.

143. Elford, J., et al., *Migration and geographic variations in blood pressure in Britain.* BMJ, 1990. **300**(6720): p. 291-295.

144. Blane, D., *The life course, the social gradient, and health*, in *Social determinants of health*, M. Marmot and R.G. Wilkinson, Editors. 2006, Oxford University Press: Oxford. p. 54.

145. Bartley, M., et al., *Birth weight and later socioeconomic disadvantage: evidence from the 1958 British cohort study.* BMJ, 1994. **309**(6967): p. 1475-1478.

146. Power, C. and S. Matthews, *Origins of health inequalities in a national population sample.* The Lancet, 1997. **350**(9091): p. 1584-1589.

147. Galobardes, B., J.W. Lynch, and G. Davey-Smith, *Childhood Socioeconomic Circumstances and Cause-specific Mortality in Adulthood: Systematic Review and Interpretation.* Epidemiologic Reviews, 2004. **26**(1): p. 7-21.

148. Melchior, M., et al., *Why Do Children from Socioeconomically Disadvantaged Families Suffer from Poor Health When They Reach Adulthood? A Life-Course Study.* American Journal of Epidemiology, 2007. **166**(8): p. 966-974.

149. Pollitt, R., K. Rose, and J. Kaufman, *Evaluating the evidence for models of life course socioeconomic factors and cardiovascular outcomes: a systematic review.* BMC Public Health, 2005. **5**(1): p. 7.

150. Smith, G.D., et al., *Lifetime socioeconomic position and mortality: prospective observational study.* BMJ, 1997. **314**(7080): p. 547.

151. Lynch, J.W., G.A. Kaplan, and S.J. Shema, *Cumulative Impact of Sustained Economic Hardship on Physical, Cognitive, Psychological, and Social Functioning.* New England Journal of Medicine, 1997. **337**(26): p. 1889-1895.

152. Bartley, M. and I. Plewis, *Does health-selective mobility account for socioeconomic differences in health? Evidence from England and Wales, 1971 to 1991.* J Health Soc Behav, 1997. **38**: p. 376 - 386.

153. Dahl, E., *Social mobility and health: cause or effect?* BMJ, 1996. **313**(7055): p. 435-436.

154. *Inequalities in health. The Black report*, ed. P. Townsend and N. Davidson. 1982: Penguin.

155. West, P., *Rethinking the health selection explanation for health inequalities.* Soc Sci Med, 1991. **32**: p. 373 - 384.

156. Loury, G.C., T. Modood, and S.M. Teles, *Introduction*, in *Ethnicity, social mobility and public policy: Comparing the US and UK*, T.M. G.C. Loury, S. M. Teles, Editor. 2005, Cambridge University Press. p. 1-17.

157. Blane, D., G. Smith, and M. Bartley, *Social selection: what does it contribute to social class differences in health?* Sociology of health and illness, 1993. **15**: p. 1 - 15.

158. Hallqvist, J., et al., *Can we disentangle life course processes of accumulation, critical period and social mobility? An analysis of disadvantaged socio-economic positions and myocardial infarction in the Stockholm Heart Epidemiology Program.* Social Science & Medicine, 2004. **58**(8): p. 1555-1562.

159. Mishra, G., et al., *A structured approach to modelling the effects of binary exposure variables over the life course.* International Journal of Epidemiology, 2009. **38**(2): p. 528-537.

160. Harding, S., *Social mobility and self-reported limiting long-term illness among West Indian and South Asian migrants living in England and Wales.* Social Science & Medicine, 2003. **56**(2): p. 355-61.

161. Gilman, S.E., *Invited Commentary: The Life Course Epidemiology of Depression.* American Journal of Epidemiology, 2007. **166**(10): p. 1134-1137.

162. Maughan, B. and G. McCarthy, *Childhood adversities and psychosocial disorders.* British Medical Bulletin, 1997. **53**(1): p. 156-169.

163. Maughan, B. and J. Kim-Cohen, *Continuities between childhood and adult life.* The British Journal of Psychiatry, 2005. **187**(4): p. 301-303.

164. Rutter, M.L., *Psycho-social disorders in childhood, and their outcome in adult life.* J R Coll Physicians, 1970. **4**.

165. Lorant, V., et al., *Socioeconomic Inequalities in Depression: A Meta-Analysis.* Am. J. Epidemiol., 2003. **157**(2): p. 98-112.

166. Skapinakis, P., *Commentary: Socioeconomic position and common mental disorders: what do we need to know?* International Journal of Epidemiology, 2007. **36**(4): p. 786-788.

167. Fan, A.P. and W.W. Eaton, *Longitudinal study assessing the joint effects of socio-economic status and birth risks on adult emotional and nervous conditions.* The British Journal of Psychiatry, 2001. **178**(40): p. s78-s83.

168. Gilman, S.E., et al., *Socioeconomic status in childhood and the lifetime risk of major depression.* International Journal of Epidemiology, 2002. **31**(2): p. 359-367.

169. Stansfeld, S.A., et al., *Repeated exposure to socioeconomic disadvantage and health selection as life course pathways to mid-life depressive and anxiety disorders.* Soc Psychiat Epidemiol, 2010.

170. Power, C., et al., *Life-course influences on health in British adults: effects of socio-economic position in childhood and adulthood.* International Journal of Epidemiology, 2007. **36**(3): p. 532-539.

171. Stansfeld, S.A., et al., *Childhood and adulthood socio-economic position and midlife depressive and anxiety disorders.* British Journal of Psychiatry, 2008. **192**: p. 152-153.

172. Collishaw, S., et al., *Resilience to adult psychopathology following childhood maltreatment: Evidence from a community sample.* Child Abuse & Neglect, 2007. **31**(3): p. 211-229.

173. Mensah, F.K. and J. Hobcraft, *Childhood deprivation, health and development: associations with adult health in the 1958 and 1970 British prospective birth cohort studies.* Journal of Epidemiology and Community Health, 2008. **62**(7): p. 599-606.

174. Rodgers, B., *Adult affective disorder and early environment.* The British Journal of Psychiatry, 1990. **157**(4): p. 539-50.

175. Rosenman, S. and B. Rodgers, *Childhood adversity in an Australian population.* Social Psychiatry and Psychiatric Epidemiology, 2004. **39**(9): p. 695-702.

176. Ford, E., C. Clark, and S.A. Stansfeld, *The influence of childhood adversity on social relations and mental health at mid-life.* Journal of Affective Disorders. **133**(1-2): p. 320-327.

177. Jefferis, B.J.M.H., et al., *Effects of Childhood Socioeconomic Circumstances on Persistent Smoking.* American Journal of Public Health, 2004. **94**(2): p. 279-285.

178. Jefferis, B., et al., *Cigarette consumption and socio-economic circumstances in adolescence as predictors of adult smoking.* Addiction, 2003. **98**(12): p. 1765-1772.

179. Jefferis, B.J.M.H., et al., *Changing social gradients in cigarette smoking and cessation over two decades of adult followâ€• up in a British birth cohort.* Journal of Public Health, 2004. **26**(1): p. 13-18.

180. Power, C., et al., *The contribution of childhood and adult socioeconomic position to adult obesity and smoking behaviour: an international comparison.* International Journal of Epidemiology, 2005. **34**(2): p. 335-344.

181. Galea, S., A. Nandi, and D. Vlahov, *The Social Epidemiology of Substance Use.* Epidemiologic Reviews 2004. **26**(1): p. 36-52.

182. Montgomery, S.M., et al., *Unemployment, cigarette smoking, alcohol consumption and body weight in young British men.* The European Journal of Public Health, 1998. **8**(1): p. 21-27.

183. Siahpush, M., et al., *Socioeconomic variations in nicotine dependence, self-efficacy, and intention to quit across four countries: findings from the International Tobacco Control (ITC) Four Country Survey.* Tobacco Control, 2006. **15**(suppl 3): p. iii71-iii75.

184. Lynch, J., G. Kaplan, and J. Salonen, *Why do poor people behave poorly? Variation in adult health behaviours and psychosocial characteristics by stages of the socioeconomic lifecourse.* Soc Sci Med, 1997. **44**: p. 809 - 819.

185. Batty, G.D., et al., *Problem drinking and exceeding guidelines for 'sensible' alcohol consumption in Scottish men: associations with life course socioeconomic*

disadvantage in a population-based cohort study. BMC Public Health, 2008. **8**(1): p. 302.

186. Caldwell, T.M., et al., *Lifecourse socioeconomic predictors of midlife drinking patterns, problems and abstention: Findings from the 1958 British Birth Cohort Study.* Drug and Alcohol Dependence, 2008. **95**(3): p. 269-278.

187. Wiles, N.J., et al., *Socio-economic status in childhood and later alcohol use: a systematic review*.* Addiction, 2007. **102**(10): p. 1546-1563.

188. Jefferis, B.J.M.H., O. Manor, and C. Power, *Social gradients in binge drinking and abstaining: trends in a cohort of British adults.* Journal of Epidemiology and Community Health, 2007. **61**(2): p. 150-153.

189. Herring, R., V. Berridge, and B. Thom, *Binge drinking: an exploration of a confused concept.* Journal of Epidemiology and Community Health, 2008. **62**(6): p. 476-479.

190. McAlaney, J. and J. McMahon, *Establishing rates of binge drinking in the UK: Anomalies in the data.* Alcohol and Alcoholism, 2006. **41**(4): p. 355-357.

191. Viner, R.M. and B. Taylor, *Adult outcomes of binge drinking in adolescence: findings from a UK national birth cohort.* Journal of Epidemiology and Community Health, 2007. **61**(10): p. 902-907.

192. Haynes, J.C., et al., *Alcohol consumption as a risk factor for anxiety and depression.* The British Journal of Psychiatry, 2005. **187**(6): p. 544-551.

193. Kraus, L., et al., *Association of Average Daily Alcohol Consumption, Binge Drinking and Alcohol-Related Social Problems: Results from the German Epidemiological Surveys of Substance Abuse.* Alcohol and Alcoholism, 2009. **44**(3): p. 314-320.

194. Jefferis, B.J.M.H., C. Power, and O. Manor, *Adolescent drinking level and adult binge drinking in a national birth cohort*.* Addiction, 2005. **100**(4): p. 543-549.

195. Bonomo, Y.A., et al., *Teenage drinking and the onset of alcohol dependence: a cohort study over seven years.* Addiction, 2004. **99**(12): p. 1520-1528.

196. Newton, A., et al., *Impact of the new UK licensing law on emergency hospital attendances: a cohort study.* Emergency Medicine Journal, 2007. **24**(8): p. 532-534.

197. Saffer, H. and F. Chaloupka, *The effect of tobacco advertising bans on tobacco consumption.* Journal of Health Economics, 2000. **19**(6): p. 1117-1137.

198. Emslie, C., et al., *Are there gender differences in levels of heavy, binge and problem drinking? Evidence from three generations in the west of Scotland.* Public Health, 2009. **123**(1): p. 12-14.

199. Spinney, L., *Public smoking bans show signs of success in Europe.* The Lancet, 2007. **369**(9572): p. 1507-1508.

200. Sargent, R.P., R.M. Shepard, and S.A. Glantz, *Reduced incidence of admissions for myocardial infarction associated with public smoking ban: before and after study.* BMJ, 2004. **328**(7446): p. 977-980.

201. Bhaumik, S., *Ban on smoking in workplaces in India has led to more smoke free homes.* BMJ. **346**.

202. Statistics., O.f.N., *General lifestyle survey overview: A report on the 2010 general lifestyle survey.* . 2012.

203. Idler, E.L. and Y. Benyamini, *Self-Rated Health and Mortality: A Review of Twenty-Seven Community Studies.* Journal of Health and Social Behavior, 1997. **38**(1): p. 21-37.

204. Tomoyuki, K., *Self-rated health and life prognosis.* Archives of Medical Research, 2003. **34**(4): p. 343-347.

205. Bjorner, J., P. Fayers, and E. Idler, *Self-rated health*, in *Assessing quality of life in clinical trials*, P. Fayers and R. Hays, Editors. 2005, Oxford University Press: Oxford. p. 309-324.

206. Eriksson, I., A.-L. Unden, and S. Elofsson, *Self-rated health. Comparisons between three different measures. Results from a population study.* International Journal of Epidemiology, 2001. **30**(2): p. 326-333.

207. Singh-Manoux, A., et al., *Self-Rated Health and Mortality: Short- and Long-Term Associations in the Whitehall II Study.* Psychosomatic Medicine, 2007. **69**(2): p. 138-143.

208. Mikolajczyk, R., et al., *Factors associated with self-rated health status in university students: a cross-sectional study in three European countries.* BMC Public Health, 2008. **8**(1): p. 215.

209. Chandola, T. and C. Jenkinson, *Validating Self-rated Health in Different Ethnic Groups.* Ethnicity & Health, 2000. **5**(2): p. 151-159.

210. Spiers, N., et al., *Are Gender Differences in the Relationship Between Self-Rated Health and Mortality Enduring? Results From Three Birth Cohorts in Melton Mowbray, United Kingdom.* The Gerontologist, 2003. **43**(3): p. 406-411.

211. Hyde, M., et al., *Comparison of the effects of low childhood socioeconomic position and low adulthood socioeconomic position on self rated health in four European studies.* Journal of Epidemiology and Community Health, 2006. **60**(10): p. 882-886.

212. Regidor, E., et al., *Heterogeneity in the association between socioeconomic position in early life and adult self-rated health in two birth cohorts of Spanish adults.* Journal of Epidemiology and Community Health. **65**(11): p. 999-1005.

213. Singh-Manoux, A., et al., *What does self rated health measure? Results from the British Whitehall II and French Gazel cohort studies.* Journal of Epidemiology and Community Health, 2006. **60**(4): p. 364-372.

214. Bosma, H., H.D.v.d. Mheen, and J.P. Mackenbach, *Social class in childhood and general health in adulthood: questionnaire study of contribution of psychological attributes.* BMJ, 1999. **318**(7175): p. 18-22.

215. Kestila, L., et al., *Determinants of health in early adulthood: what is the role of parental education, childhood adversities and own education?* The European Journal of Public Health, 2006. **16**(3): p. 305-314.

216. Osler, M., et al., *Effect of grandparent's and parent's socioeconomic position on mortality among Danish men born in 1953.* The European Journal of Public Health, 2005. **15**(6): p. 647-651.

217. Chandola, T., et al., *Pathways between education and health: a causal modelling approach.* Journal of the Royal Statistical Society Series A, 2006. **169**(2): p. 337-359.

218. Castles, S., *International Migration at the Beginning of the Twenty-First Century: Global Trends and Issues.* International Social Science Journal, 2000. **52**(165): p. 269-281.

219. Held, D., et al., *Global transformations: Politics, economics and culture*. 1999, Cambridge: Polity.

220. UN HCR, *http://www.unhcr.org/pages/49c3646c1d.html [Accessed 31 October 2011]*. The UN Refugee Agency [online], 2011.

221. Kogan, I. and Y. Cohen, *Educational selectivity and labour market attainment of Jewish immigrants from the Former Soviet Union in Israel and Germany in the 1990s*, in *Migrants and Markets: Perspectives from economic and the other social sciences*, H. Kolb and H. Egbert, Editors. 2008, Amsterdam University Press: Amsterdam. p. 104-119.

222. Abadan-Unat, N., *Turkish migration to Europe*, in *The Cambridge Survey of World Migration*, R. Cohen, Editor. 1995, Press Syndicate of The University of Cambridge: Cambridge. p. 279.

223. Jong, G.F.D. and A.B. Madamba, *A Double Disadvantage? Minority Group, Immigrant Status, and Underemployment in the United States.* Social Science Quarterly, 2001. **82**(1): p. 117-130.

224. Slack, T. and L. Jensen, *Underemployment across immigrant generations.* Social Science Research, 2007. **36**(4): p. 1415-1430.

225. Harding, S. and R. Balarajan, *Longitudinal study of socio-economic differences in mortality among South Asian and West Indian migrants.* Ethnicity & Health, 2001. **6**(2): p. 121-8.

226. King, M., et al., *Incidence of psychotic illness in London: comparison of ethnic groups.* BMJ, 1994. **309**(6962): p. 1115-1119.

227. Beiser, M., et al., *Poverty, Family Process, and the Mental Health of Immigrant Children in Canada.* Am J Public Health, 2002. **92**(2): p. 220-227.

228. Cantor-Graae, E. and J.-P. Selten, *Schizophrenia and Migration: A Meta-Analysis and Review.* Am J Psychiatry, 2005. **162**(1): p. 12-24.

229. Lindert, J., et al., *Depression and anxiety in labor migrants and refugees - A systematic review and meta-analysis.* Social Science & Medicine, 2009. **69**(2): p. 246-257.

230. Porter, M. and N. Haslam, *Predisplacement and Postdisplacement Factors Associated With Mental Health of Refugees and Internally Displaced Persons: A Meta-analysis.* JAMA, 2005. **294**(5): p. 602-612.

231. Stroup, D.F., et al., *Meta-analysis of Observational Studies in Epidemiology.* JAMA: The Journal of the American Medical Association, 2000. **283**(15): p. 2008-2012.

232. StataCorp, *Stata Statistical Software: Release 10*. 2007, StataCorp L.P.: College Station, TX.

233. DerSimonian, R. and N. Laird, *Meta-analysis in clinical trials.* Controlled Clinical Trials, 1986. **7**(3): p. 177-188.

234. Bradburn, M.J., J.J. Deeks, and D.G. Altman, *Metan- An alternative meta-analysis command*, in *STATA Technical Bulletin*, H.J. Newton, et al., Editors. 1998, Stata corporation.

235. Higgins, J.P.T., et al., *Measuring inconsistency in meta-analyses.* BMJ, 2003. **327**(7414): p. 557-560.

236. Egger, M., M. Schneider, and G.D. Smith, *Meta-analysis Spurious precision? Meta-analysis of observational studies.* BMJ, 1998. **316**(7125): p. 140-144.

237. Higgins, J.P.T. and S. Green, eds. *Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0. Available from www.cochrane-handbook.org*. 2011, The Cochrane Collaboration.

238. Muntaner, C., et al., *Socioeconomic Position and Major Mental Disorders.* Epidemiol Rev, 2004. **26**(1): p. 53-62.

239. Krieger, N., D.R. Williams, and N.E. Moss, *Measuring Social Class in US Public Health Research: Concepts, Methodologies, and Guidelines.* Annual Review of Public Health, 1997. **18**(1): p. 341-378.

240. Galobardes, B., J. Lynch, and G. Davey-Smith, *Measuring socioeconomic position in health research.* Br Med Bull, 2007. **81-82**(1): p. 21-37.

241. Inclan, J., *Psychological symptomatology in second generation puerto rican women of three socioeconomic groups.* Journal of Community Psychology, 1983. **11**(4): p. 334-345.

242. Hollingshead, A.B., ed. *Two Factor Index of Social Position.* 1957: New Haven, CT.

243. Aycan, Z. and J.W. Berry, *Impact of Employment-Related Experiences on Immigrants' Psychological Well-Being and Adaptation to Canada.* Canadian Journal of Behavioural Science, 1996. **28**(3): p. 240-251.

244. Beiser, M., P.J. Johnson, and R.J. Turner, *Unemployment, underemployment and depressive affect among Southeast Asian refugees.* Psychological Medicine, 1993. **23**(03): p. 731-743.

245. Eaton, W.W. and J.-C. Lasry, *Mental health and occupational mobility in a group of immigrants.* Social Science & Medicine, 1978. **12**: p. 53-58.

246. Blishen, B.R. and H.A.M. Roberts, *A revised socioeconomic index for occupation in Canada.* Canadian Review of Sociology/Revue canadienne de sociologie, 1976. **13**(1): p. 71-79.

247. Nicklett, E.J. and S.A. Burgard, *Downward social mobility and major depressive episodes among Latino and Asian-American immigrants to the United States.* American Journal of Epidemiology, 2009. **170**(6): p. 793-801.

248. Lindencrona, F., S. Ekblad, and E. Hauff, *Mental health of recently resettled refugees from the Middle East in Sweden: the impact of pre-resettlement trauma, resettlement stress and capacity to handle stress* Social Psychiatry and Psychiatric Epidemiology, 2007. **43**(2): p. 121-131.

249. Tinghög, P., et al., *The Association of Immigrant- and Non-Immigrant-Specific Factors With Mental Ill Health Among Immigrants in Sweden.* International Journal of Social Psychiatry, 2010. **56**(1): p. 74-93.

250. Tinghög, P., T. Hemmingsson, and I. Lundberg, *To what extent may the association between immigrant status and mental illness be explained by socioeconomic factors?* . Social Psychiatry and Psychiatric Epidemiology, 2007. **42**(12): p. 990-996.

251. Abbott, M.W., et al., *Chinese migrants' mental health and adjustment to life in New Zealand.* Australian and New Zealand Journal of Psychiatry, 1999. **33**(1): p. 13 - 21.

252. VanOort, F.V.A., et al., *Development of ethnic disparities in internalizing and externalizing problems from adolescence into young adulthood.* Journal of Child Psychology and Psychiatry, 2007. **48**(2): p. 176-184.

253. Lerner, Y., J. Kertes, and N. Zilber, *Immigrants from the former Soviet Union, 5 years post-immigration to Israel: adaptation and risk factors for psychological distress.* Psychological Medicine, 2005. **35**(12): p. 1805-1814.

254. Tiffin, P.A., M.S. Pearce, and L. Parker, *Social mobility over the lifecourse and self reported mental health at age 50: prospective cohort study.* Journal of Epidemiology and Community Health, 2005. **59**(10): p. 870-872.

255. Kahn Rs, B.D.W.R.C., *Combined effect of mothers' and fathers' mental health symptoms on children's behavioral and emotional well-being.* Archives of Pediatrics & Adolescent Medicine, 2004. **158**(8): p. 721-729.

256. Armistead, L., K. Klein, and R. Forehand, *Parental physical illness and child functioning.* Clinical Psychology Review, 1995. **15**(5): p. 409-422.

257. Rossow, I. and J. Rise, *Concordance of parental and adolescent health behaviors.* Social Science & Medicine, 1994. **38**(9): p. 1299-1305.

258. Gilman, S.E., *Commentary: Childhood socioeconomic status, life course pathways and adult mental health.* International Journal of Epidemiology, 2002. **31**(2): p. 403-404.

259. Rutter, J., *Migration, migrants and child poverty*, in *Poverty*. 2011, Child Poverty Action Group. p. 6-10.

260. Fischer, J.A., et al., *Childhood and adolescent psychopathology and subsequent tobacco smoking in young adults: findings from an Australian birth cohort.* Addiction, 2012. **107**(9): p. 1669-1676.

261. Colman, I., et al., *Outcomes of conduct problems in adolescence: 40 year follow-up of national cohort.* BMJ, 2009. **338**.

262. Goodman, A., V. Patel, and D. Leon, *Child mental health differences amongst ethnic groups in Britain: a systematic review.* BMC Public Health, 2008. **8**(1): p. 258.

263. Plewis, I., et al., *National Child Development Study and 1970 British Cohort Study Technical Report: Changes int he NCDS and BCS70, populations and samples over time*. October 2004, Centre for longitudinal studies. p. 1-39.

264. Elliot, J. and P. Shepherd, *Cohort profile: 1970 British Birth Cohort (BCS70).* International Journal of Epidemiology 2006. **35**: p. 836-843.

265. Rutter, M., J. Tizard, and K. Whitmore, *Education, health and behaviour*. 1970, London: Longmans.

266. Rodgers, B., et al., *Validity of the Malaise Inventory in general population samples.* Social Psychiatry and Psychiatric Epidemiology, 1999. **34**(6): p. 333-341.

267. Centre for Longitudinal Studies and Institute of Education. *Teaching students quantitative methods using resources from the British Birth Cohorts*. Measuring signs of psychological distress and depression: The Malaise Inventory. http://www.esds.ac.uk/doc/5805/mrdoc/pdf/MalaiseQuestions.pdf Accessed 2011.

268. Stott, D.H., *The Social Adjustment of Children.* 3rd ed. 1969, London, England: University of London Press.

269. Centre for Longitudinal Studies, Institute of Education, and University of London, *National Child Development Study: Notes on the Bristol Social Adjustment Guide. http://www.esds.ac.uk/doc/5565%5Cmrdoc%5Cpdf%5Cbsag_codings_in_ncds.pdf. Based on notes appearing in the NCDS1 Coding Frame, page 72*. year unknown.

270. Ghodsian, M., *Children's behaviour and the BSAG: Some theoretical and statistical considerations.* British Journal of Social and Clinical Psychology, 1977. **16**(1): p. 23-28.

271. Rutter, M., *A children's behaviour questionnaire for completion by teachers.* J Child Psychol Psychiatry 1967. **8**: p. 1-11.

272. Elander, J. and M. Rutter, *An update on the status of the Rutter parent's and teachers' scales.* Child Psychology and Psychiatry Review, 1996. **1**: p. 31-35.

273. Ghodsian, M., et al., *Changes in behaviour ratings in a national sample of children* British Journal of Social and Clinical Psychology, 1980. **19**: p. 247-256.

274. Centre for Longitudinal Studies and Institute of Education. *Teaching students quantitative methods using resources from the British Birth Cohorts.* Measuring behaviour difficulties of children and teenagers. http://www.esds.ac.uk/doc/5805%5Cmrdoc%5Cpdf%5CRutterBehaviourSummary.pdf Accessed 2011.

275. Ghodsian, M., *Growing Up in Britain*, in *Measuring behaviour in the school and home*, K. Fogelman, Editor. 1983, The Macmillan Press Ltd: London, England. p. 329-338.

276. Englund, M.M., et al., *Childhood and adolescent predictors of heavy drinking and alcohol use disorders in early adulthood: a longitudinal developmental analysis.* Addiction, 2008. **103**: p. 23-35.

277. Lynskey, M.T. and D.M. Fergusson, *Childhood conduct problems, attention deficit behaviors, and adolescent alcohol, tobacco, and illicit drug use.* Journal of Abnormal Child Psychology, 1995. **23**(3): p. 281-302.

278. Hope, S., C. Power, and B. Rodgers, *Does financial hardship account for elevated psychological distress in lone mothers?* Social Science & Medicine, 1999. **49**(12): p. 1637-1649.

279. Stansfeld, S. and M. Marmot, *Deriving a survey measure of social support: The reliability and validity of the Close Person's Questionnaire* Social Science & Medicine 1992. **35**(8): p. 1027-1035.

280. Rutter, M., J. Tizard, and K. Whitmore, *Chapter 21: Family aspects of physical and psychiatric disorders*, in *Education, health and behaviour*. 1970, Longmans: London. p. 339-340.

281. Brodman, K., et al., *The Cornell Medical Index: An adjunct to medical interview*. JAMA, 1949. **140**: p. 530=4.

282. Rutter, M., P. Graham, and W. Yule, *A neuropsychiatric study in childhood.* Clinics in developmental medicine. 1970, London: Heinemann Medical

283. Power, C., O. Manor, and J. Fox, *Chapter 3: Social differences in health in early adulthood*, in *Health and class: The early years*, C. Power, O. Manor, and J. Fox, Editors. 1991, Chapman and Hall: London. p. 50.

284. Cheung, Y.B., *Early origins and adult correlates of psychosomatic distress.* Social Science & Medicine, 2002. **55**(6): p. 937-948.

285. World Health Organisation, *The ICD-10 Classification of Mental and Behavioural Disorders: Diagnostic criteria for research*. 1993, Geneva: WHO.

286. Singleton, N., et al., *Psychiatric morbidity among adults living in private households, 2000*. 2001, Office For National Statistics: London.

287. BRUGHA, T.S., et al., *Cross validation of a general population survey diagnostic interview: a comparison of CIS-R with SCAN ICD-10 diagnostic categories.* Psychological Medicine, 1999. **29**(05): p. 1029-1042.

288. JORDANOVA, V., et al., *Validation of two survey diagnostic interviews among primary care attendees: a comparison of CIS-R and CIDI with SCAN ICD-10 diagnostic categories.* Psychological Medicine, 2004. **34**(06): p. 1013-1024.

289. Clark, C. and S. Stansfeld. *Scoring the CIS-R in the NCDS Biomedical Survey*. October 2004.

290. Singleton, N., et al., *Psychiatric morbidity among adults living in private households, 2000*. 2001, The Stationery Office: London

291. Maggs, J.L., M.E. Patrick, and L. Feinstein, *Childhood and adolescent predictors of alcohol use and problems in adolescence and adulthood in the National Child Development Study.* Addiction, 2008. **103**: p. 7-22.

292. Ewing, J.A., *Detecting Alcoholism* JAMA 1984. **252**(14): p. 1905-1907.

293. Shields, A.L. and J.C. Caruso, *A Reliability Induction and Reliability Generalization Study of the Cage Questionnaire.* Educational and Psychological Measurement, 2004. **64**(2): p. 254-270.

294. Aertgeerts, B., F. Buntinx, and A. Kester, *The value of the CAGE in screening for alcohol abuse and alcohol dependence in general clinical populations: a diagnostic meta-analysis.* Journal of Clinical Epidemiology 2004. **57**(1): p. 30-39.

295. Cherpitel, C.J., *Screening for alcohol problems in the emergency room: a rapid alcohol problems screen.* Drug and Alcohol Dependence, 1995. **40**(2): p. 133-137.

296. Bush, B., et al., *Screening for alcohol abuse using the cage questionnaire.* The American Journal of Medicine, 1987. **82**(2): p. 231-235.

297. Matano, R.A., et al., *Assessment of binge drinking of alcohol in highly educated employees.* Addictive Behaviors, 2003. **28**(7): p. 1299-1310.

298. Kelly, T.M., et al., *Alcohol Use Disorders Among Emergency Department–Treated Older Adolescents: A New Brief Screen (RUFT-Cut) Using the AUDIT, CAGE, CRAFFT, and RAPS-QF.* Alcoholism: Clinical and Experimental Research, 2004. **28**(5): p. 746-753.

299. Bernadt, M.W., et al., *Comparison of questionnaire and laboratory tests in the detection of excessive drinking and alcoholism.* The Lancet, 1982. **319**(8267): p. 325-328.

300. Beresford, T.P., et al., *Comparison of CAGE questionnaire and computer-assisted laboratory profiles in screening for covert alcoholism.* The Lancet, 1990. **336**(8713): p. 482-485.

301. Dhalla, S. and J.A. Kopec, *The CAGE Questionnaire for Alcohol Misuse: A Review of Reliability and Validity Studies*. 2007. 2007.

302. Babor, T.F., et al., *AUDIT: Alcohol Use Disorders Identification Test: Guidelines for use in primary care*. 2nd ed. 2001, Geneva: WHO.

303. Berner, M.M., et al., *The Alcohol Use Disorders Identification Test for Detecting At-Risk Drinking: A Systematic Review and Meta-Analysis.* Journal of studies on alcohol and drugs, 2007. **68**(3): p. 461-471.

304. Babyak, M.A., *Understanding confounding and mediation.* Evidence Based Mental Health 2009. **12**(3): p. 68-71.

305. Vyas, S. and L. Kumaranayake, *Constructing socio-economic status indices: how to use principal components analysis.* Health Policy and Planning, 2006. **21**(6): p. 459-468.

306. UCLA: Academic Technology Services and Statistical Consulting Group, *Annotated SPSS Output; Factor Analysis: from http://www.ats.ucla.edu/stat/spss/output/factor1.htm. Accessed April 2013. .*

307. STATA 10.1 IC. *Factor postestimation help pages*.

308. UCLA: Academic Technology Services and Statistical Consulting Group, *http://www.ats.ucla.edu/stat/stata/dae/zinb.htm. Stata Data Analysis Examples: Zero-inflated Negative Binomial Regression. Accessed April 2013. .*

309. UCLA: Academic Technology Services and Statistical Consulting Group, *http://www.ats.ucla.edu/stat/stata/faq/countfit.htm. Stata FAQ:How can I use countfit in choosing a count model? Accessed April 2013.*

310. Hawkes, D. and I. Plewis, *Modelling non-response in the National Child Development Study.* Journal of the Royal Statistical Society: Series A (Statistics in Society) 2006. **169**(3): p. 479-491.

311. Rubin, D.B., *Inference and missing data.* Biometrika, 1976. **63**(3): p. 581-592.

312. Little, R. and D. Rubin, eds. *Statistical analysis with missing data. Second edition*. 2002, Wiley & sons: Chichester.

313. Tilling, L., *Missing Data* on Advanced Epidemiological and Statistical Methods Short Course, Bristol. (Lecture notes and personal communcation), 2010.

314. McKnight, P.E., et al., *Classifying Missing Data*, in *Missing Data: A Gentle Introduction*. 2007, The Guildford Press: New York.

315. Schafer, J.L. and J.W. Graham, *Missing data: Our view of the state of the art.* Psychological Methods, 2002. **7**(2): p. 147-177.

316. White, I.R., P. Royston, and A.M. Wood, *Multiple imputation using chained equations: Issues and guidance for practice.* Statistics in Medicine 2011. **30**(4): p. 377-399.

317. Royston, P., *Multiple imputation by the MICE system of chained equations.* MRC Clinical Trials Unit, London.

318. Royston, P., *Multiple imputation of missing values: Update.* Stata Journal, 2005. **5**(2): p. 1-14.

319. McKnight, P.E., et al., *Multiple Imputation*, in *Missing Data: A Gentle Introduction*. 2007, The Guildford Press: New York.

320. Meng, X.-L., *Multiple-Imputation Inferences with Uncongenial Sources of Input.* Statistical Science, 1994. **9**: p. 538-558.

321. Sterne, J.A.C., et al., *Multiple imputation for missing data in epidemiological and clinical research: potential and pitfalls.* BMJ, 2009. **338**.

322. Das-Munshi, J., et al., *Does childhood adversity account for poorer mental and physical health in second-generation Irish people living in Britain? Birth cohort study from Britain (NCDS).* BMJ Open 2013. **3**(3).

323. Noble, M., et al., *Measuring multiple deprivation at the small-area level.* Environment and Planning A, 2006. **38**(1): p. 169-185.

324. Power, C. and J. Elliot, *Cohort profile: 1958 British Birth Cohort (National Child Development Study).* International Journal of Epidemiology 2006. **35**: p. 34-41.

325. Power, C., et al., *Childhood and adulthood risk factors for socio-economic differentials in psychological distress: evidence from the 1958 British birth cohort.* Social Science & Medicine, 2002. **55**(11): p. 1989-2004.

326. Das-Munshi, J., et al., *Born into adversity: Factors accounting for psychological distress in two birth cohorts of second generation Irish children growing up in Britain.* Journal of Public Health 2013. In press

327. White, I.R. and J.B. Carlin, *Bias and efficiency of multiple imputation compared with complete-case analysis for missing covariate values.* Statistics in Medicine. **29**(28): p. 2920-2931.

328. Klebanoff, M.A., et al., *Preterm and small-for-gestational-age birth across generations.* American journal of obstetrics and gynecology, 1997. **176**(3): p. 521-526.

329. Lawlor, D.A., G. Davey Smith, and S. Ebrahim, *Association between leg length and offspring birthweight: partial explanation for the trans-generational association between birthweight and cardiovascular disease: findings from the British Women's Heart and Health Study*. Paediatric and Perinatal Epidemiology, 2003. **17**(2): p. 148-155.

330. Harding, S., M. Rosato, and J. Cruickshank, *Lack of change in birthweights of infants by generational status among Indian, Pakistani, Bangladeshi, Black Caribbean, and Black African mothers in a British cohort study.* International Journal of Epidemiology, 2004. **33**(6): p. 1279-1285.

331. Millward, D. and S. Karlsen, *Tobacco use among minority ethnic populations and cessation interventions*, in *Better Health Briefing*. 2011 May. Report: Better Health Briefing, 22, London: Race Equality Foundation

332. Tennant, C., *Parental loss in childhood: Its effect in adult life*, in *Social psychiatry: theory, methodology and practice*, P. Bebbington, Editor. 1991, Transaction Publishers: New Brunswick, New Jersey.

333. Smith, N.R., *Intergenerational continuities in ethnic inequalities in health in the UK. PhD thesis.* 2010, University College London: London.

334. Barbeau, E.M., A. Leavy-Sperounis, and E.D. Balbach, *Smoking, social class, and gender: what can public health learn from the tobacco industry about disparities in smoking?* Tobacco Control, 2004. **13**(2): p. 115-120.

335. Nazroo, J., *Genetic, cultural or socio-economic vulnerability? Explaining ethnic inequalities in health.* Sociology of health and illness, 1998. **20**(5): p. 710 - 730.

336. Heath, A. and J. Ridge, *Social mobility of ethnic minorities.* Journal of Biosocial Science, 1983. **15**(SupplementS8): p. 169-184.

337. Zhou, M., *Ethnicity as social capital: community-based institutions and embedded networks of social relations.*, in *Ethnicity, social mobility and public policy: Comparing the USA and UK*, G.C. Loury, T. Modood, and S.M. Teles, Editors. 2005, Cambridge University Press: Cambridge. p. 131-159.

338. Hickman, M.J., *Integration or Segregation? The Education of the Irish in Britain in Roman Catholic Voluntary-Aided Schools.* British Journal of Sociology of Education, 1993. **14**(3): p. 285-300.

339. Ben-Shlomo, Y., *Rising to the challenges and opportunities of life course epidemiology.* International Journal of Epidemiology, 2007. **36**(3): p. 481-483.

340. Blane, D., *The life course, the social gradient, and health.* Social Determinants of Health, 1999: p. 65 - 80.

341. Greaves, L. and N. Jategaonkar, *Tobacco policies and vulnerable girls and women: toward a framework for gender sensitive policy development.* Journal of Epidemiology and Community Health, 2006. **60**(suppl 2): p. ii57-ii65.

342. Graham, H. and G. Der, *Patterns and predictors of tobacco consumption among women.* Health Education Research, 1999. **14**(5): p. 611-618.

343. O'Dwyer, P., *The Irish and substance abuse.* , in *Ethnocultural factors in substance abuse treatment.* , S.L.A. Straussner, Editor. 2001, The Guilford Press: New York. p. 199-215.

344. Paradies, Y., *A systematic review of empirical research on self-reported racism and health.* Int. J. Epidemiol., 2006. **35**(4): p. 888-901.

345. Pickett, K.E. and R.G. Wilkinson, *People like us: ethnic group density effects on health.* Ethnicity & Health, 2008. **13**(4): p. 321-334.

346. Das-Munshi, J., et al., *Does social disadvantage over the life-course account for alcohol and tobacco use in Irish people? Birth cohort study.* The European Journal of Public Health.

347. Malcolm, E., *The Catholic Church and the Irish Temperance Movement, 1838-1901.* Irish Historical Studies, 1982. **23**(89): p. 1-16.

348. Abdalla, S., et al., *Social inequalities in health expectancy and the contribution of mortality and morbidity: the case of Irish Travellers.* Journal of Public Health.

349. MacKinnon, D.P., J.L. Krull, and C.M. Lockwood, *Equivalence of the Mediation, Confounding and Suppression Effect.* Prev Sci, 2000. **1**(4): p. 173.

350. MacKinnon, D.P., A.J. Fairchild, and M.S. Fritz, *Mediation Analysis.* Annu Rev Psychol 2007. **58**: p. 593.

351. Ryan, L., et al., *Family Strategies and Transnational Migration: Recent Polish Migrants in London.* Journal of Ethnic and Migration Studies, 2008. **35**(1): p. 61-77.

352. Burrell, K., *Staying, returning, working and living: key themes in current academic research undertaken in the UK on migration movements from Eastern Europe.* Social Identities. **16**(3): p. 297-308.

353. Sumption, M., W. Somerville, and Migration Policy Institute report, *The UK's new Europeans: Progress and challenges five years after accession*. 2010, Equality and Human Rights Commission.

354. Dustmann, C., *Return Migration, Investment in Children, and Intergenerational Mobility: Comparing Sons of Foreign and Native Born Fathers*. 2007, IZA discussion paper 3080.

355. De Stavola, B.L., et al., *Statistical Issues in Life Course Epidemiology*. American Journal of Epidemiology, 2006. **163**(1): p. 84-96.

Appendix A: Frequency distributions of Rutter A and BSAG

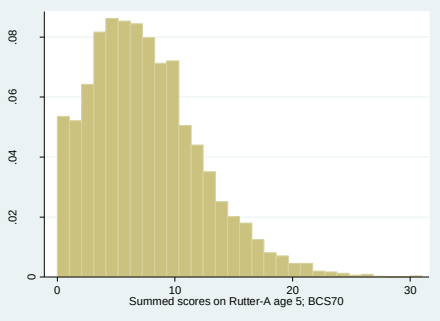

Figure 1a

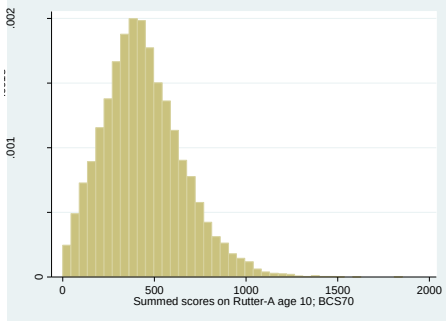

Figure 1b

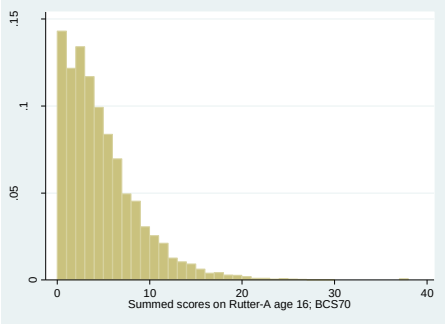

Figure 1c

Frequency distributions of summed scores on the Rutter-A (parent rated) in BCS70; As assessed at age 5 (fig 1a), age 10 (fig 1b) and age 16 (fig 1c)

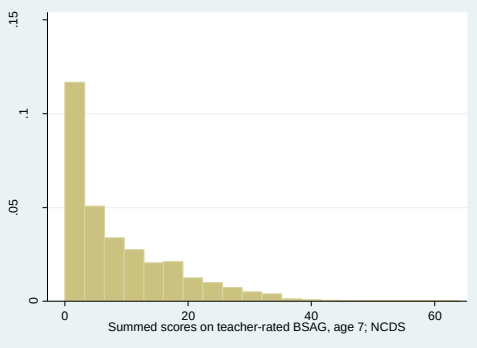

Figure 2a

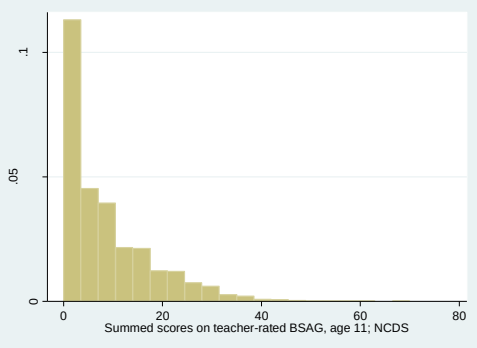

Figure 2b

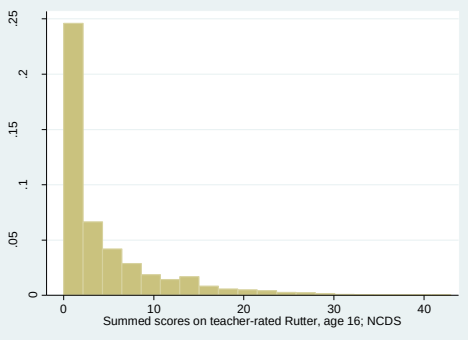

Figure 2c

Frequency distributions of summed scores on the BSAG (teacher-rated) in NCDS; As assessed at age 5 (fig 2a), age 10 (fig 2b) and as assessed through the Rutter-B (teacher-rated) at age 16 (fig 1c)

Appendix B: Publications

Peer reviewed publications

Das-Munshi J, Leavey G, Stansfeld SA, Prince MJ. Does social disadvantage over the life-course account for alcohol and tobacco use in Irish people? Birth cohort study. *European Journal of Public Health* 2013; doi: 10.1093/eurpub/ckt122

Das-Munshi J, Clark C, Dewey ME, Leavey G, Stansfeld SA, Prince MJ. Born into adversity: Psychological distress in two birth cohorts of second generation Irish children growing up in Britain. *Journal of Public Health* 2013; doi: 10.1093/pubmed/fdt034

Das-Munshi J, Clark C, Dewey ME, Leavey G, Stansfeld SA, Prince MJ. Does childhood adversity account for poorer mental and physical health in second generation Irish people living in Britain? Birth cohort study from Britain (NCDS). *BMJ Open* 2013;3:e001335 doi:10.1136/bmjopen-2012-001335

Das-Munshi J, Leavey G, Stansfeld SA, Prince MJ. Migration, social mobility and common mental disorders: Critical review of the literature and meta-analysis. *Ethnicity and Health;* 2011: 17(1-2)17-53.

Conference proceedings

Das-Munshi J, Clark C, Dewey ME, Leavey G, Stansfeld SA, Prince MJ. Psychosocial adversity in childhood accounts for poorer mental and physical health problems in adulthood in second generation Irish people in Britain. Psychosomatic Medicine 2013:75(3):pA145

Das-Munshi J, Clark C, Dewey ME, Leavey G, Stansfeld SA, Prince MJ. Born into adversity: The intergenerational 'transmission' of psychological morbidity in second generation Irish children growing up in Britain. Journal of Epidemiology and Community Health 2011: 65 (supp II):pA32

Das-Munshi J, Clark C, Dewey ME, Leavey G, Stansfeld SA, Prince MJ. Born into adversity: The intergenerational 'transmission' of psychological morbidity in second generation Irish children growing up in Britain. American Journal of Epidemiology 2011: 173(suppl 11): p.S321

Appendix C: Table 1

Social class by ethnicity over the life-course; 1958 British birth cohort (imputed data)

	UK-born parents (%)	Irish-born parent(s) (%)	Full sample (%)	X^2; *p*
Father's social class-birth				
non-manual	17%	10%	17%	X^2= 1768.72; p<0.001
manual	83%	90%	83%	
Father's social class- age 7				
non-manual	30%	16%	29%	X^2 = 3906.00; p<0.001
manual	70%	84%	71%	
Father's social class- age 11				
non-manual	33%	21%	32%	X^2 = 2883.71 ; p<0.001
manual	67%	79%	68%	
Father's social class- age 16				
non-manual	33%	21%	33%	X^2 = 2891.19 ; p<0.001
manual	67%	79%	67%	
Respondent social class, age 23				
non-manual	52%	53%	52%	X^2 = 7.23; p=0.007
manual	48%	47%	48%	
Respondent social class, age 33				
non-manual	57%	55%	57%	X^2 = 60.57 ; p<0.001
manual	43%	45%	43%	
Respondent social class, age 44/ 45				
non-manual	59%	59%	59%	X^2 = 0.07; p= 0.792
manual	41%	41%	41%	

Appendix D: Table 2

Cumulative exposure to manual social class over the life-course and associations with mid-life common mental disorders (CMD) and poorer self-rated health (full sample)[1,2]

		Mid-life CMD N=8403			Mid-life poorer self-rated health N=8243		
		OR	**(95% CI)**		**OR**	**(95% CI)**	
Manual social class in childhood (age 0, 7, 11, 16)*	Never manual	1.00	REF		1.00	REF	
	once	1.03	(0.76,	1.41)	1.22	(0.95,	1.58)
	twice	1.22	(0.84,	1.76)	1.31	(0.96,	1.77)
	thrice	1.63	(1.21,	2.20)	1.84	(1.42,	2.38)
	four times	1.50	(1.20,	1.88)	1.96	(1.62,	2.38)
Manual social class in adulthood (age 23, 33, 44/45)	Never manual	1.00	REF		1.00	REF	
	once	1.10	(0.87,	1.38)	1.24	(1.03,	1.50)
	twice	1.50	(1.21,	1.86)	1.73	(1.44,	2.07)
	thrice	1.52	(1.28,	1.81)	2.33	(2.02,	2.69)
Manual social class (all ages)	Never manual	1.00	REF		1.00	REF	
	once	1.19	(0.80,	1.76)	1.24	(0.88,	1.74)
	twice	1.22	(0.81,	1.83)	1.59	(1.12,	2.27)
	thrice	1.51	(1.02,	2.24)	1.69	(1.21,	2.37)
	four times	1.53	(1.11,	2.10)	1.86	(1.41,	2.44)
	five times	1.58	(1.10,	2.25)	2.02	(1.50,	2.72)
	six times	2.10	(1.50,	2.95)	2.66	(1.97,	3.58)
	seven times	1.96	(1.44,	2.67)	3.43	(2.63,	4.47)

***Key**: [1]p<0.001 (trend) for all models. [2]No evidence of statistically significant interactions (p>0.10) noted with Irish ethnicity in any of the models; *in childhood parental social class was used*

Appendix E: Table 3

Associations with Irish ethnicity and mid-life common mental disorders and poorer self-rated health, adjusting for childhood adversity, broken down by age

	Common mental disorders			Poorer self-rated health		
	OR	**95% CI**	**p**	**OR**	**95% CI**	**p**
Baseline model (no mediators, adjusted for gender only)						
Irish ethnicity	**1.27**	**0.96,1.69**	**0.10**	**1.25**	**0.98,1.60**	**0.07**
Age 7						
Irish ethnicity	**1.13**	**0.84,1.51**	**0.42**	**1.13**	**0.88,1.45**	**0.33**
female gender	1.79	1.56,2.06	p<0.001	1.01	0.90,1.12	0.91
overcrowding	1.30	1.13,1.50	p<0.001	1.30	1.16,1.47	p<0.001
financial difficulties	1.98	1.55,2.53	p<0.001	1.66	1.33,2.09	p<0.001
Age 11						
Irish ethnicity	**1.17**	**0.87,1.56**	**0.29**	**1.16**	**0.91,1.48**	**0.24**
female gender	1.80	1.56,2.06	p<0.001	1.01	0.90,1.13	0.90
overcrowding	1.19	1.03,1.37	0.02	1.31	1.16,1.48	p<0.001
financial difficulties	1.56	1.24,1.96	p<0.001	1.43	1.18,1.75	p<0.001
Free school meals	1.59	1.26,2.02	p<0.001	1.20	0.97,1.49	0.08
Age 16						
Irish ethnicity	**1.18**	**0.88,1.58**	**0.26**	**1.15**	**0.90,1.48**	**0.26**
female gender	1.81	1.58,2.08	p<0.001	1.01	0.91,1.13	0.80
overcrowding	1.05	0.88,1.24	0.60	1.23	1.07,1.40	p<0.001
financial difficulties	1.83	1.44,2.34	p<0.001	1.51	1.21,1.87	p<0.001
Free school meals	1.48	1.13,1.95	p<0.001	1.36	1.08,1.71	0.01
Age 16 + summed measure of access to amenities at age 7, 11, 16						
Irish ethnicity	**1.17**	**0.87,1.57**	**0.29**	**1.14**	**0.89,1.46**	**0.30**
female gender	1.81	1.58,2.08	p<0.001	1.01	0.90,1.13	0.84
overcrowding	1.03	0.87,1.22	0.73	1.20	1.05,1.38	0.01
financial difficulties	1.81	1.42,2.31	p<0.001	1.49	1.19,1.85	p<0.001
Free school meals	1.44	1.09,1.89	0.01	1.32	1.04,1.66	0.02
Lacked access to hot water, indoor toilet or bathroom at 7, 11, 16	1.29	1.05,1.58	0.01	1.34	1.12,1.60	p<0.001

Appendix F: Table 4

Association of parental migration history (Irish vs non-Irish) with common mental disorders at mid-life (age 44/ 45) (complete case models)

Age	Adjustments	N	OR	95% CI	p value
Baseline model					
44/ 45	Gender, no mediators, imputed model	8403	1.27	0.96, 1.69	0.10
44/ 45	Gender, no mediators, complete case model	7951	1.29	0.97,1.72	0.08
Models adjusting for gender + material adversity over the life-course					
44/ 45	Material adversity- no mediators	7383	1.29	0.95, 1.74	0.10
44/ 45	Material adversity- mediators	7383	1.29	0.95, 1.76	0.11
42	Material adversity- no mediators	4090	1.02	0.67, 1.57	0.91
42	Material adversity-mediators	4090	1.09	0.70, 1.69	0.70
33	Material, adversity- no mediators	6472	1.19	0.85, 1.67	0.30
33	Material, adversity- mediators	6472	1.19	0.85, 1.67	0.32
23	Material adversity- no mediators	6522	1.05	0.74,1.50	0.77
23	Material adversity-mediators	6522	0.97	0.68,1.39	0.88
7, 11, 16	Material adversity-no mediators	4252	1.69	1.13,2.53	0.01
7, 11, 16	Material adversity-mediators	4252	1.53	1.02, 2.32	0.04
Models adjusting for gender + health-related behaviours					
44/ 45	Hazardous alcohol use- no mediators	7404	1.32	0.98,1.79	0.07
44/ 45	Hazardous alcohol use- mediators	7404	1.30	0.96,1.76	0.09
33, 42	Hazardous alcohol use- no mediators	6832	1.15	0.83, 1.61	0.41
33, 42	Hazardous alcohol use- mediators	6832	1.12	0.80, 1.57	0.51
23,33, 42	Smoker or ex-smoker	6151	0.98	0.67, 1.43	0.90
23,33, 42	Smoker or ex-smoker	6151	0.96	0.66, 1.42	0.85

Age	Adjustments	N	OR	95% CI	p value
Models adjusting for gender + previous mental health over the life-course					
23, 33	Adult depression- no mediators	6072	0.93	0.63,1.38	0.72
23, 33	Adult depression- with mediators	6072	1.02	0.67,1.56	0.91
7,11, 16	Childhood psychological problems- no mediators	5142	1.42	0.98,2.05	0.06
7, 11, 16	Childhood psychological problems- with mediators	5142	1.39	0.96,2.02	0.08
Models adjusting for gender + social support over the life-course					
44/ 45	Social support- no mediators	7040	1.24	0.91, 1.70	0.18
44/ 45	Social support- mediators	7040	1.27	0.92, 1.74	0.15
42	Social support- no mediators	7710	1.22	0.91, 1.64	0.19
42	Social support- mediators	7710	1.22	0.91, 1.64	0.20
33	Social support- no mediators	7149	1.20	0.88, 1.65	0.25
33	Social support- mediators	7149	1.19	0.87, 1.63	0.29
Models adjusting for gender + stressful life events over the life-course					
44/ 45	Job insecurity- no mediators	6584	1.18	0.82,1.68	0.37
44/ 45	Job insecurity- mediators	6584	1.19	0.83,1.70	0.35
44/ 45	Stressful life events- no mediator	7390	1.31	0.97,1.77	0.08
44/ 45	Stressful life events- mediator	7390	1.27	0.94,1.73	0.12
7	Family adversity- no mediators	5608	1.72	1.23,2.39	<0.001
7	Family adversity-mediators	5608	1.60	1.15,2.24	0.01
Models adjusting for gender + recalled parental health in childhood					
Child-hood	Parental alcohol problems- no mediators	7681	1.19	0.88, 1.60	0.26
Child-hood	Parental alcohol problems-mediators	7681	1.08	0.80, 1.47	0.60
Child-hood	Parental mental health problems-no mediators	7679	1.19	0.88, 1.61	0.25
Child-hood	Parental mental health problems-mediators	7679	1.12	0.83, 1.52	0.45

Appendix G: Table 5

Association of parental migration history (Irish vs non-Irish) with poorer self-rated health at mid-life (age 44/ 45) (complete case models)

Age	Adjustments	N	OR	95% CI	p value
	Baseline model				
44/ 45	Gender no mediators- imputed model	8243	1.25	0.98, 1.60	0.07
44/ 45	Gender, no mediators- complete case model	7800	1.27	1.00, 1.62	0.05
Models adjusting for gender + material adversity over the life-course					
44/ 45	Material adversity- no mediators	7308	1.32	1.03, 1.69	0.03
44/ 45	Material adversity- mediators	7309	1.34	1.03, 1.74	0.03
42	Material adversity- no mediators	4023	1.28	0.91, 1.81	0.16
42	Material adversity-mediators	4023	1.39	0.97, 1.99	0.07
33	Material, adversity- no mediators	6360	1.21	0.92, 1.60	0.18
33	Material, adversity- mediators	6360	1.20	0.90, 1.60	0.21
23	Material adversity-no mediators	6401	1.14	0.86,1.52	0.36
23	Material adversity- mediators	6401	1.06	0.80,1.42	0.68
7, 11, 16	Material adversity-no mediators	4174	1.43	1.01,2.03	0.05
7, 11, 16	Material adversity-mediators	4174	1.27	0.89,1.82	0.19
Models adjusting for gender + health-related behaviours					
44/ 45	Hazardous alcohol use- no mediators	7267	1.26	0.98,1.63	0.08
44/ 45	Hazardous alcohol use- mediators	7267	1.25	0.96,1.61	0.09
33, 42	Hazardous alcohol use- no mediators	6707	1.10	0.83, 1.46	0.50
33, 42	Hazardous alcohol use- mediators	6707	1.08	0.81, 1.43	0.61
23, 33, 42	Smoker or ex-smoker	6045	1.02	0.74, 1.39	0.92
23, 33, 42	Smoker or ex-smoker	6045	0.99	0.73,1.36	0.97
Models adjusting for gender + previous mental health over the life-course					
23,33	Adult depression- no mediators	5968	1.01	0.74,1.38	0.97
23, 33	Adult depression-mediators	5968	1.08	0.78,1.50	0.63
7, 11, 16	Childhood psychological problems- no mediators	5044	1.16	0.83,1.61	0.38

Age	Adjustments	N	OR	95% CI	p value
7, 11, 16	Childhood psychological problems- mediators	5044	1.13	0.81,1.58	0.48
Models adjusting for gender + social support over the life-course					
44/ 45	Social support- no mediators	6974	1.37	1.06, 1.77	0.02
44/ 45	Social support- mediators	6974	1.38	1.07, 1.79	0.01
42	Social support- no mediators	7567	1.19	0.93, 1.54	0.17
42	Social support- mediators	7567	1.19	0.93, 1.53	0.17
33	Social support- no mediators	7020	1.20	0.92, 1.57	0.17
33	Social support- mediators	7020	1.19	0.91,1.55	0.20
Models adjusting for gender + stressful life events over the life-course					
44/ 45	Job insecurity- no mediators	6519	1.37	1.04,1.81	0.03
44/ 45	Job insecurity- mediators	6519	1.38	1.04,1.82	0.02
44/ 45	Stressful life events- no mediators	7369	1.31	1.02,1.68	0.03
44/ 45	Stressful life events- mediators	7369	1.30	1.01,1.67	0.04
7	Family adversity- no mediators	5511	1.36	1.01,1.84	0.04
7	Family adversity- mediators	5511	1.27	0.94,1.72	0.11
Models adjusting for gender + recalled parental health in childhood					
Childhood	Parental alcohol problems- no mediators	7527	1.29	1.01, 1.65	0.04
Childhood	Parental alcohol problems- mediators	7527	1.25	0.97, 1.60	0.08
Childhood	Parental mental health problems- no mediators	7525	1.30	1.01, 1.66	0.04
Childhood	Parental mental health problems- mediators	7252	1.28	1.00, 1.64	0.05

Appendix H: Table 6

Adversity over the life-course by ethnicity, proportions

Variable, age		Both parents UK-born	2nd generation Irish	Total
		(%)	(%)	(%)
Household overcrowding, 7	up to 1 person	59%	40%	58%
	1+ person	41%	60%	42%
Household overcrowding, 11	up to 1 person	62%	46%	61%
	1+ person	38%	54%	39%
Household overcrowding, 16	up to 1 person	70%	54%	69%
	1+ person	30%	46%	31%
Household crowding at age 23	up to 1 person	97%	95%	96%
	1+ person	3%	5%	4%
Household overcrowding, 33	up to 1 person	87%	86%	87%
	1+ person	13%	14%	13%
Household overcrowding, 42	up to 1 person	89%	88%	89%
	1+ person	11%	12%	11%
Family financial difficulties, 7	No	92%	83%	91%
	Yes	8%	17%	9%
Family financial difficulties, 11	No	89%	83%	89%
	Yes	11%	17%	11%
Family financial difficulties, 16	No	90%	83%	90%
	Yes	10%	17%	10%
Free school meals, 11	No	90%	84%	90%
	Yes	10%	16%	10%
Free school meals, 16	No	91%	83%	90%
	Yes	9%	17%	10%
Family difficulties, 7	None	79%	67%	78%
	At least one	21%	33%	22%
Recalled childhood adversity (mid-life)	None	44%	38%	44%
	At least one	56%	62%	56%
No access- hot water, indoor toilet or bathroom, 7,11,16	Never	79%	71%	79%
	At least once	21%	29%	21%

Access to toilet, 23	Sole access, indoor toilet	94%	94%	94%
	Outdoor/ shared toilet	6%	6%	6%
Access to bath/ shower, 23	Sole use of bath	96%	96%	96%
	Shared/ no access	4%	4%	4%
Social housing, age 23	Other	85%	82%	85%
	Council housing	15%	18%	15%
Ever been homeless, 23	No	94%	93%	94%
	Yes	6%	7%	6%
Receipt of benefits, 23	None	66%	61%	65%
	yes received	34%	39%	35%
Employment, 23	Employed	90%	88%	90%
	Unemployed	10%	12%	10%
Employment , 33	Employed	94%	94%	94%
	Unemployed	6%	6%	6%
Emotional social support, 33	Low support	20%	24%	21%
	Medium/ high support	80%	76%	79%
Practical social support, 33	Low support	19%	22%	20%
	Medium/ high support	81%	78%	80%
Owes money for bills, 33	No	97%	96%	97%
	Yes	3%	4%	3%
Access to telephone, 33	Yes	91%	92%	91%
	No	9%	8%	9%
Ever had problems with damp/ mould, 33	No	87%	86%	87%
	Yes	13%	14%	13%
Social housing, 33	No	83%	83%	83%
	Yes	17%	17%	17%
Lack of central heating, 33	No	83%	82%	83%
	Yes	17%	18%	17%
Shared bathroom/kitchen, 33	No	99%	99%	99%
	Yes	1%	1%	1%
Social housing, 42	No	87%	86%	87%
	Yes	13%	14%	13%
Car ownership, 42	Owns car	92%	91%	92%
	No car	8%	9%	8%
Homelessness, 42	Not homeless since 33	94%	94%	94%
	Homeless since 33	6%	6%	6%

Have someone turn to for advice/ support, 42	Yes	96%	96%	96%
	No	4%	4%	4%
Benefits, 42	Not on benefits	70%	66%	70%
	On benefits	30%	34%	30%
How well managing financially, 42	Living comfortably	70%	68%	70%
	Just about getting by/finding it difficult	30%	32%	30%
Employment status, 42	Employed	84%	85%	84%
	Not employed	16%	15%	16%
Stressful life event in last 6 months, 44/ 45	No	46%	44%	46%
	Yes	54%	56%	54%
Difficulties in meeting payment of bills?44/ 45	Slight/ little difficulty	83%	81%	83%
	Some/ great difficulty	17%	19%	17%
Not enough money for food or clothing, 44/ 45	Seldom/ never	74%	77%	74%
	Sometimes/often/always	26%	23%	26%
Household cars, 44/ 45	1+ cars	92%	91%	92%
	None	8%	9%	8%
Job security, 44/ 45	Secure	83%	84%	83%
	Insecure	17%	16%	17%
Confiding social support, 44/ 45	Low	37%	37%	37%
	Medium to high	63%	63%	63%
Practical social support, 44/ 45	Low	39%	38%	39%
	Medium to high	61%	62%	61%
Negative social support, 44/ 45	Low	47%	49%	47%
	Medium to high	53%	51%	53%